City of Burlington Fire Dept.

Request for Proposal

The City of Burlington, Vermont, Fire Department is soliciting proposals to furnish a new and unused **75 ft aerial quint fire truck**.

Proposal should be submitted to:

Burlington Fire Department
Attn: Chief Engineer Michael O'Neil
136 South Winooski Avenue
Burlington, VT. 05401

Proposals should be submitted according the following specifications and requirements no later than**4:00PM Friday August 6, 2010**.

Selected vendor will need to comply with the City of Burlington's contract requirements.

Complete specifications and requirements for the aerial are attached.

Questions concerning these specifications may be directed to:

Deputy Chief Bruce Bourgeois
136 South Winooski Avenue
Burlington, VT 05401
802 316 1284

Any unauthorized contact between any prospective proposer and any official or employee of Burlington on or after the date the RFP is issued, or at any time during this procurement process may, at the unilateral determination of the City, be grounds for disqualification of the proposer's proposal.

The City of Burlington, Vermont reserves the right to consider proposals for 150 days after receipt thereof, and further reserves the right to reject any or all proposals; waive any defects, informalities and minor irregularities; to accept exceptions to these specifications; and make such awards or act otherwise as it alone may deem in its best interest.

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Intent of Specifications

It is the intent of these specifications to clearly describe the furnishing and delivery to the Purchaser, a complete apparatus equipped as specified. The primary objective of these specifications is to obtain the most acceptable apparatus for service in the Fire Department. These specifications cover specific requirements as to the type of construction and tests the apparatus must conform, together with certain details as to finish, material preferences, equipment and appliances with which the successful bidder must conform.

The design of the apparatus must embody the latest approved automotive design practices. The workmanship must be of the highest quality in its respective field. Special consideration shall be given to service access to areas needing periodic maintenance, ease of operation, and symmetrical proportions. Construction must be heavy-duty and ample safety factors must be provided to carry loads as specified. The construction method employed will be in such a manner as to allow ready removal of any component for service or repair.

The apparatus shall conform to the National Fire Protection Association Standard for Automotive Fire Apparatus, number 1901, in its most recent edition, unless otherwise specified in this document. Only the specified firefighting support equipment listed in these specifications shall be provided.

The apparatus shall further conform to all Federal Motor Vehicle Safety Standards. No exception.

Each bidder shall furnish satisfactory evidence of their ability to design, engineer, and construct the apparatus specified and shall state the location of the factory producing the apparatus. They shall also substantiate they are in a position to render prompt and proper service and to furnish replacement parts for the apparatus.

Each bid must be accompanied by a set of detailed contractor's specifications consisting of a detailed description of the apparatus and equipment proposed.

All bid proposal specifications must be in the same sequence as the advertised specification for ease of comparison. These specifications shall include size, location, type, and model of all component parts being furnished. Detailed information shall be provided on the materials used to construct all facets of the apparatus body. Any bidder who fails to submit detailed construction specifications, or who photo copies and submits these specifications as their own construction details will be considered non-responsive and shall render their proposal ineligible for award. No exception.

Bids will be addressed and submitted in accordance with the instructions provided on the cover sheet.

It shall be the responsibility of the bidder to assure that their proposal arrives at the location and time indicated. Late proposals, telegrams, facsimile, or telephone bids will not be considered. No exception.

Bid Bond

A bid security in the form of a Bid Bond, cashier's check, or certified check made payable to the Purchaser in the amount of ten percent (10%) of the total bid shall be required. This shall serve

as a guarantee which may be forfeited and retained by the Purchaser in lieu of its other legal remedies if a successful bidder's proposal is accepted by the Purchaser and the bidder shall fail to execute and return to the Purchaser the required contract and bonds within ten (10) days after delivery. If a Bid Bond is provided, it shall be issued by a bonding company licensed to bond in this State.

Proposal Price

Each bidder's proposal must include all items required in the specifications unless a specific exception is taken. Any bidder who option prices an item included in these specifications that does not specifically require option pricing will have their proposal rejected without further cause.

All proposals are to be priced with payment due upon delivery and acceptance in Burlington, VT. No progress or pre-payments are to be required as part of the proposal pricing.

Certificate of Insurance

Each bidder shall furnish, with their proposal, a Certificate of Product Liability Insurance for a minimum of ten (10) million dollars. Failure to provide this documentation shall render the proposal non-responsive and the bid shall be rejected. This certificate shall be from the prime builder only. Certificates submitted from various sub-contractors in order to total the ten million dollar minimum will not be acceptable as meeting the requirements of this section.

If one of the major portions of the apparatus (i.e. chassis, aerial, or body) is not designed, fabricated, and assembled by the prime builder, a separate Certificate of Liability Insurance for a minimum of ten (10) million dollars must be provided by each additional contractor.

The Certificate must be made out to the Purchaser and must be original. Submission of a non-original Certificate, or a Certificate provided that is not made out to the Purchaser will not meet the requirements of this section.

Aerial Certification

Each bidder shall submit evidence of compliance to NFPA 1901 Standard for Aerial Ladder Fire Apparatus, in its latest edition, Sections 18-20 and 18-21, regarding structural and stability requirements. Evidence of a minimum 2.5 to 1 factor of structural safety based on the results of analytical, experimental, and structural analysis shall be provided with the bid. The analysis shall be performed and verified by a third party registered professional engineer. Submission of "in-house" certifications do not meet the requirements of this section. Failure to comply with this requirement will render the bidder's proposal unresponsive and ineligible for contract award.

Single Source Manufacturer

In order to protect the Purchaser from divided warranty responsibility between chassis, aerial, and body manufacturers, proposals will only be considered from apparatus builders who design, fabricate, and assemble the complete apparatus at their own facilities. This shall include the cab

shell, chassis assembly, aerial device, and complete body structure. Private labeling of another manufacturer's chassis, aerial, or body will not meet the requirements of this section.

Delivery

The bidder shall state the time required for delivery of the completed unit on the proposal page. The completed unit shall be delivered to the purchaser with full instructions provided to Fire Department personnel on operation, care and maintenance of apparatus at the purchaser's location.

Exceptions

The following apparatus specifications are considered minimum design and construction standards against which the apparatus will be inspected. It is the intent to receive proposals on equipment/apparatus meeting the attached detailed specifications in their entirety. Any proposals being submitted, without "Full Compliance" with these specifications, shall so state on the bid proposal page, followed by a detailed "Letter of Exceptions" listing the areas of non-compliance. The reference must include page number, paragraph, and the exact nature of the exception.

Failure to follow this format, provided for the convenience of the Purchaser, will render the vendor's proposal non-responsive and ineligible for award of contract.

The Purchaser may add the statement "No Exception" to a component or design feature in these specifications. In the interest of fleet conformity or specific performance requirements, the Purchaser will not permit exceptions taken to these item(s). The Purchaser reserves the right to reject any or all bid proposals and purchase the equipment it deems most suitable to its needs. The Purchaser does not, in any way, obligate itself to accept the lowest or any bid. Any bidder taking total exception to the complete specification or a major element will result in immediate rejection of the proposal.

Financial Statement

It is the intention of the Purchaser to contract for construction of this apparatus with a manufacturer who is financially sound. In order for us to evaluate the financial stability of each manufacturer, a current Dunn and Bradstreet and/or Annual Report shall be provided with the proposal. Failure to submit these documents with the proposal will render the bid unresponsive and ineligible for contract award.

ISO Compliance

The manufacturer shall operate a Quality Management System meeting the requirements of ISO 9001:2000.

The International Organization for Standardization (ISO) is a recognized world leader in establishing and maintaining stringent manufacturing standards and values. The

manufacturer's certificate of compliance affirms that these principles form the basis for a quality system that unswervingly controls design, manufacture, installation, and service.

The manufacturer's quality systems shall consist of, but not be limited to, all written quality procedures (aka QOP) and other procedures referenced within the pages of the manufacturer's Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts products or processes. In addition, all apparatus assembly processes shall be documented for traceability and reference. The manufacturer shall also engage the services of a certified third party for testing purposes where required.

If the manufacturer operates more than one manufacturing facility each facility must be ISO certified.

By virtue of its ISO compliance the manufacturer shall provide an apparatus that is built to exacting standards, meets the customer's expectations, and satisfies the customer's requirements.

A copy of the manufacturer's certificate of ISO compliance for each manufacturing facility shall be provided with the bid.

Reference List

Each bid shall be accompanied by a list of at least twenty-five (25) similarly constructed apparatus presently in service. Each reference must be apparatus built of the same construction style as these specifications call for. This list shall include customers' names, addresses, and the date the apparatus was placed in service.

Service Requirements

Each bidder shall supply, with their proposal, detailed information on the bidder's ability to perform routine and emergency service on the apparatus after delivery. Detailed information shall be provided on service facilities, personnel, service vehicles, and the type and nature of repair work the bidder is able to provide. Bidder shall state the number of miles from the Purchaser's facility to the nearest fully staffed repair facility operated by the bidder. It is the intent of the Purchaser to assure that parts and service are readily available for the equipment specified. Service capabilities will be one of the highly rated criteria for award of this contract.

NFPA Compliance

The E-ONE supplied components of the apparatus shall be compliant with NFPA 1901, 2009 edition.

BUMPERS

Bumper

The vehicle shall be equipped with a one-piece 10” high bumper, made from 10-gauge (0.135” nominal) polished stainless steel for corrosion resistance, strength, and long-lasting appearance. It shall be mounted directly to the front frame extensions for maximum strength. The bumper shall incorporate two (2)-stiffening ribs.

Bumper Extension

The bumper extension shall be approximately 20” from the face of the cab as required.

Bumper Gravel Shield

The extended front bumper gravel shield shall be made of 1/8” (.125”) aluminum treadplate material.

BUMPER TRAYS

Bumper Tray - Center

A hose tray constructed of 1/8” aluminum shall be recessed into the front bumper extension. The tray shall be located in the center of the bumper and be approximately 14" deep (13" to the top of the slats). One inch thick aluminum slats shall be included in the bottom of the hose tray to aid in the dissipation of water from the tray.

Lid, Bumper Hose Tray

The center bumper tray shall have a diamond plate lid. The lid shall be hinged and shall be secured in the closed position by a D-Ring latch and held open with a pneumatic shock.

FRAME ASSEMBLY

Frame Rail Construction

The frame shall consist of two (2) C-channel frame rails with heavy-duty cross members. Each frame rail shall have the following minimum specifications in order to minimize frame deflection under load and thereby improve vehicle ride and extend the life of the frame:

Dimensions: 10-1/4” x 3-1/2” x 3/8”

Material: 110,000-psi minimum yield strength, high strength, low alloy steel

Section Modulus: 16.61 cu. in.

Resisting Bending Moment (RBM): 1,827,045-in. lbs.

If larger rails are provided, the maximum height of each frame rail shall not exceed the 10-1/4" dimension by more than 1/2" in order to ensure the lowest possible body height for ease of access as well as the lowest possible vehicle center of gravity for maximum stability.

There shall be a minimum of six (6) cross members joining the two (2) frame rails in order to make the frame rigid and hold the rails/liners in alignment. The cross members shall be a combination of a formed steel C-channel design along with heavy duty steel fabricated designs as required for the exact chassis configuration. The cross members shall be attached to the frame rails with not less than four (4) bolts at each end arranged in a bolt pattern to adequately distribute the cross member load into the rail/liner and minimize stress concentrations.

All frame fasteners shall be high-strength, Grade 8, flanged-head threaded bolts and nuts for frame strength, durability, and ease of repair. The nuts shall be Stover locknuts to help prevent loosening. The frame fasteners shall be tightened to the proper torque at the time of assembly.

The frame rails and frame liners shall be finished with black paint. The frame cross members and frame-mounted components (suspensions, axles, air tanks, battery boxes, fuel tank, etc.) shall be painted black.

The apparatus manufacturer shall supply a full lifetime frame warranty including cross members against defects in materials or workmanship. Warranties that provide a lifetime warranty for only the frame rails, but not the cross members, are not acceptable. **NO EXCEPTIONS**.

The custom chassis frame shall have a **WHEEL ALIGNMENT** in order to achieve maximum vehicle road performance and to promote long tire life. The alignment shall conform to the manufacturer`s internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery upon request.

Frame Liner

A 9-3/8" x 3-1/8" x 3/8" channel frame liner shall be bolted to each frame rail for added strength and rigidity. Frame liners shall be made of 110,000-psi minimum yield, high strength, low alloy steel. Each frame rail with liner shall have the following minimum characteristics:

Section Modulus: 28.74 cu. in.

RBM: 3,161,400 in. lbs.

The frame liners shall be inserted inside the open portion of the frame rails and shall run continuously from the rear of the frame to the centerline of the front axle to provide maximum frame strength at all critical load points.

AXLE OPTIONS

Front Axle

The vehicle shall utilize an ArvinMeritor FL-943 5" drop beam front axle with a rated capacity of 20,000 lbs. It shall have "easy steer" knuckle pin bushings and 68.83" kingpin centers. The axle shall be of I-beam construction and utilize grease-lubricated wheel bearings. The vehicle shall have a nominal cramp angle of 45 degrees, plus two (+ 2) degrees to minus three (- 3) degrees including front suction applications.

The front axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub-piloted wheels in order to improve wheel centering and extend tire life. The front axle shall be equipped with 16-1/2" x 6" S-cam brakes with ArvinMeritor automatic slack adjusters. The front springs shall be parabolic tapered, minimum 4" wide x 54" long (flat), minimum three (3) leaf, progressive rate with bronze bushings and a capacity of 20,000 lbs. at the ground.

Tapered leaf springs provide a 20% ride improvement over standard straight spring systems. Supporting documentation/data shall be provided upon request.

The vehicle shall be equipped with a Sheppard model M110 integral power steering gear, used in conjunction with a power assist cylinder. The steering assembly shall be rated to statically steer a maximum front axle load of 20,000 lbs. Relief stops shall be provided to reduce system pressure upon full wheel cut. The system shall be able to operate mechanically should the hydraulic system fail.

A 2-year/unlimited miles parts and 2-year labor front axle warranty shall be provided as standard by ArvinMeritor Automotive.

In order to achieve maximum vehicle road performance and to promote long tire life, there shall be a wheel alignment. The alignment shall conform to the manufacturer's internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery.

Shock Absorbers Front

Koni Model 90 shock absorbers provided for the front axle. The shocks shall be three way adjustable.

The shocks shall be covered by the manufacturer's standard warranty.

Front Axle Oil Seals

The front axle shall have Stemco oil seals with sight glass to check the lubricant level of the axle spindles.

Rear Axle

The vehicle shall utilize an ArvinMeritor RS-30-185, 31,000 lb. single rear axle with single reduction hypoid gearing and a manufacturer's rated capacity of 31,000 lbs. The axle shall be equipped with oil-lubricated wheel bearings with ArvinMeritor oil seals.

The rear axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub piloted wheels to improve wheel centering and extend tire use.

A 2-year/unlimited miles parts and 2-year labor rear axle warranty shall be provided as standard by ArvinMeritor Automotive.

Automatic Traction Control

To further improve vehicle drive characteristics, the unit shall be fitted with automatic traction control (ATC). This system shall control drive wheel slip during acceleration from a resting point. An extra solenoid valve shall be added to the ABS system. The system shall control the engine and brakes to improve acceleration slip resistance. The system shall have a dash mounted light that shall come on when ATC is controlling drive wheel slip.

A 3 year/300,000 miles parts and labor Automatic Traction Control (ATC) warranty shall be provided as standard by Meritor Automotive.

SUSPENSIONS

Rear Suspension

The rear suspension shall be a Reyco model 79KB. The suspension shall include linear-rate slipper type leaf springs that eliminate spring eyes and shackles. The suspension shall also include one (1) fixed torque arm, one (1) adjustable torque arm and cast spring hangers. The suspension shall be rated for the maximum axle capacity.

WHEEL OPTIONS

Front Wheel Trim Package

The front wheels shall have stainless steel lug nut covers (chrome-plated steel lug nut covers not acceptable). The front axles shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel universal baby moons. All stainless steel baby moons shall carry a lifetime warranty plus a 2 year rebuffing policy. There shall be two (2) baby moons and twenty (20) lug nut covers.

Rear Wheel Trim Package Single Axle

The rear wheels shall have stainless steel lug nut covers (chrome-plated steel lug nut covers not acceptable), or American made chrome-plated plastic lug nut covers. The rear axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel, spring clip band mount high hats, DOT user friendly. All stainless steel high hats shall carry a lifetime warranty plus a 2 year rebuffing policy. There shall be two (2) high hats and twenty (20) lug nut covers.

Front Wheels

The vehicle shall have two (2) Accuride polished (on outer wheel surfaces only) aluminum disc wheels. They shall be forged from one piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

Rear Wheels

The vehicle shall have four (4) Accuride polished (on outer wheel surfaces only) aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

TIRE OPTIONS

Front Tires

The front tires shall be two (2) Michelin 425/65R 22.5 tubeless type 20 PR radial tires with XFE highway tread.

The tires with wheels shall have the following weight capacity and speed rating:

22,800 lbs. @ 65 MPH.

The wheels and tires shall conform to the Tire and Rim Association requirements.

Rear Tires

The rear tires shall be Michelin 315 22.5 tubeless type radial tires with XDN2 mud and snow tread.

The tires with wheels shall have the following weight capacity:

33,080 lbs. (dual) @ 75 MPH.

The wheels and tires shall conform to the Tire and Rim Association requirements.

Tire Pressure Monitor

The apparatus shall be provided with tire pressure indicating valve stem caps. The indicators shall be installed on each tire and be a heavy duty design manufactured specifically for trucks. When tire is properly inflated, the indicator inside the cap shall be green, and when the tire is underinflated by 10%, the indicator inside the cap shall be red.

BRAKE SYSTEMS

Front Brakes

The front axle shall be equipped with Meritor DiscPlus EX225H 17 inch disc brakes.

The brakes shall be covered by the manufacturer's standard warranty which is three years, unlimited mileage and parts only.

Rear Brakes

The rear axle shall be equipped with ArvinMeritor 16-1/2" x 7" Q-Plus (up to 24K) or P-Type (over 24K) S-cam brakes with cast brake drums. The brakes shall be furnished with ArvinMeritor automatic slack adjusters.

A 3 year/unlimited miles parts and 3 year labor rear brake warranty shall be provided as standard by ArvinMeritor Automotive. The warranty shall include bushings, seals, and cams.

Brake System

The vehicle shall be equipped with air-operated brakes and an anti-lock braking system (ABS). The brake system shall meet or exceed the design and performance requirements of the current Federal Motor Vehicle Safety Standard (FMVSS)-121, and the test requirements of the current NFPA 1901 Standard.

A dual-treadle brake valve shall correctly proportion the braking power between the front and rear systems. The air system shall be provided with a rapid pressure build-up feature, designed to meet current NFPA 1901 requirements, to allow the vehicle to begin its emergency response as quickly as possible.

A pressure-protection valve shall be installed to prevent use of the air horns or other air-operated devices should the air system pressure drop below 85 psi. This feature is designed to prevent inadvertent actuation of the emergency/parking brakes while the vehicle is in motion.

Two (2) air pressure needle gauges, one (1) each for front and rear air pressure, with a warning light and buzzer shall be installed at the driver`s instrument panel.

The braking system shall be provided with a minimum of three (3) air tank reservoirs for a total air system capacity of 5,214 cu. in. One (1) reservoir shall serve as the wet tank and a minimum of one (1) tank shall be supplied for each of the front and rear axles. The total system shall carry a sufficient volume of air to comply with FMVSS-121.

Tank Capacities in Cubic Inches:

Wet	Front	Rear	Total
1,738	1,738	1,738	5,214

Spring-actuated emergency/parking brakes shall be installed on the rear axle.

A Bendix-Westinghouse SR-1 valve, in conjunction with a double check valve system, shall provide automatic emergency brake application when the air brake system pressure falls below 40 psi in order to safely bring the vehicle to a stop in case of an accidental loss of braking system air pressure.

A four-channel Wabco ABS shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to both front and rear axles. All electrical connections shall be environmentally-sealed for protection against water, weather, and vibration.

The system shall constantly monitor wheel behavior during braking. Sensors on each wheel transmit wheel speed data to an electronic processor, which shall detect approaching wheel lock-up and instantly modulate (or pump) the brake pressure up to five (5) times per second to prevent wheel lock-up. Each wheel shall be individually controlled. To improve field performance, the system shall be equipped with a dual-circuit design configured in a diagonal pattern. Should a malfunction occur in one circuit, that circuit shall revert to normal braking action. A warning light at the drivers instrument panel shall signal a malfunction.

The system shall also be configured to work in conjunction with all auxiliary engine, exhaust, or driveline brakes to prevent wheel lock-up.

To improve maintenance troubleshooting, provisions in the system for an optional diagnostic tester shall be provided. The system shall test itself each time the vehicle is started, and a dash-mounted light shall go out once the vehicle is moving above 4 MPH.

A 3 year/300,000 mile parts and labor Anti-Locking Braking System (ABS) warranty shall be provided as standard by Meritor Automotive.

Park Brake Release

One (1) Bendix-Westinghouse PP-5 parking brake control valve shall be supplied on the lower dash panel within easy reach of the driver.

Parking Brake Front Axle

A front axle parking brake system shall be provided. Utilizing a separate dash mounted activation switch, the system shall apply the front axle service brake. The system shall be interlocked to the main axle rear axle parking brake parking brake system control, so as to be

operational only when the main system brakes are applied. A dash mounted warning tag shall be provided, stating; ”Low air system pressure reduces or eliminates braking force.”

AIR SYSTEM OPTIONS

Air Dryer

The chassis air system shall be equipped with a Meritor/Wabco system saver 1200 air dryer located under the cab. The air dryer shall utilize a single spin-on desiccant cartridge. **NO EXCEPTIONS**

Air Inlet

A 1/4” brass quick-release air inlet with a male connection. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging air directly into the wet tank. It shall be located driver door jamb.

Air Lines

Air-lines shall be constructed of color-coded nylon tubing routed in a manner to protect from damage. Brass fittings shall be provided.

Air Horns

Dual air horns shall be provided, connected to the chassis air system. The horns shall be mounted through the front bumper. The front bumper shall have two (2) holes punched to accommodate the horns. A pressure protection valve shall be installed to prevent the air brake system from being depleted of air pressure.

ENGINES & TRANSMISSIONS

Engine/Transmission Package

Engine

The vehicle shall utilize a Cummins ISM electronic engine as described below:

- ISM 450hp turbocharged
- Charge Air Cooled (CAC) 4-cycle diesel
- Six (6) Cylinder
- Cummins Celect fuel system
- Fuel cooler (when equiped with a fire pump)
- 661 cu.in. displacement
- 450 gross BHP at 2100 RPM and a peak torque of 1550 lb.ft. at 1200 RPM
- Bore and stroke shall be 4.92 x 5.79

• Compression ratio shall be 17:1
• Engine lubrication system shall have a minimum capacity, to include filter, of 43 quarts
• Coolant filter with corrosion inhibiting additive
• Delco-Remy 39 MD-HD 12 volt starter
• Interacta System
• 18.7 cubic foot per minute air compressor
• Exhaust gas recirculation (**does not require particulate filter)**
• Ember separator compliant with 2009 NFPA 1901 requirements
• The engine shall be compliant with 2007 EPA Emission standards

The engine air intake shall draw air through the front cab grill. The intake opening shall be located on the officer (right) side behind front cab face with a plenum that directs air to the air filter. The air cleaner shall be a 11" diameter dry type that is easily accessed for service. Air cleaner intake piping shall be made from aluminized steel tubing with flexible rubber hoses. Air cleaner intake piping clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

The engine exhaust piping shall be a minimum of 4" diameter welded aluminized steel tubing. The muffler shall be mounted horizontally under the right-hand frame rail in back of the cab in order to minimize heat transmission to the cab and its occupants. The exhaust shall be directed away from the vehicle on the right side ahead of the rear wheels in order to keep exhaust fumes as far away as possible from the cab and pump operator position.

A 5-year/100,000 miles parts and labor warranty will be provided as standard by Cummins.

A copy of the Engine Installation Review stating the engine installation meets Cummins recommendations shall be provided. The engine installation shall not require the operation of any type of "power-down" feature to meet engine installation tests.

Transmission

The vehicle shall utilize an Allison EVS4000P, electronic, 5-speed automatic transmission.

A push button shift module Allison model #29538373 shall be located right side of the steering column, within easy reach of the driver. The shift position indicator shall be indirectly lit for after dark operation. The shift module shall have a "Do Not Shift" light and a "Service" indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

The transmission shall have a gross input torque rating of 1675 lb. ft. and a gross input power rating of 580 HP.

The gear ratios shall be as follows:

1 - 3.51

2 - 1.91

3 - 1.43

4 - 1.00

5 - .74

R - 4.80

The transmission shall be equipped with a fluid level sensor (FLS) system, providing direct feedback of transmission oil level information to the operator.

The transmission shall have a lubricant capacity of 51 quarts.

A transmission oil cooler shall be provided in the lower tank of the radiator.

The transmission shall contain two engine driven PTO openings located at the 1 and 8 o`clock positions. The automatic transmission shall be equipped with a power lock-up device. The transmission lock-up shall prevent down shifting of transmission when engine speed is decreased during pump operations, thereby maintaining a constant gear ratio. Transmission lock-up shall be automatically activated when placing pump in gear. Transmission lock-up shall be automatically deactivated when disengaging pump for normal road operation.

A 5-year/unlimited miles parts and labor warranty shall be provided as standard by Allison Transmission.

Transmission Selector

A push button shift module Allison model #29538373 shall be located right side of the steering column, within easy reach of the driver. The shift position indicator shall be indirectly lit for after dark operation. The shift module shall have a ”Do Not Shift” light and a ”Service” indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data including oil life monitor, filter life monitor, transmission health monitor and fluid level. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

Transmission Fluid

The transmission fluid shall be Trans Synd synthetic.

Vehicle Speed

The maximum speed shall be electronically limited to 60 MPH as required by NFPA 1901.

SECONDARY BRAKING

Jacobs Engine Brake

One (1) Jacobs engine brake shall be installed to assist in slowing and controlling the vehicle as required by NFPA 1901 for vehicles with gross vehicle weight ratings (GVWR) of 36,000 lbs. or greater. An on-off control switch and a high-medium-low selector switch shall be mounted in the cab.

When activated, the Jacobs engine brake shall cut off the flow of fuel to the cylinders and alter the timing of the exhaust valves. This shall transform the engine into a high-pressure air compressor, driven by the wheels, and the horsepower absorbed by the engine in this mode shall slow the vehicle. The selector switch allows the driver to select the amount of retarding power.

When the on-off switch is in the ”on” position, the engine brake shall be automatically applied whenever the accelerator is in the idle position and the automatic transmission is in the lock-up mode. If the accelerator is depressed or if the on-off switch is placed in the ”off” position, the engine brake shall immediately release and allow the engine to return to its normal function.

EXHAUST OPTIONS

Exhaust End Modification

The end of the exhaust tail pipe shall be modified to accommodate a Plymovent in-house exhaust extraction system. The tailpipe will be at 90 degrees and straight out below side of body. A stop ring shall be provided on the tailpipe to properly position the plymovent nozzle.

COOLING PACKAGE

Engine Cooling Package

The cooling system shall have a tube-and-fin radiator with a minimum of 1,362 square inches of frontal area to ensure adequate cooling under all operating conditions. The radiator shall have five (5) rows of brass tubes with sixteen (16) copper fins per inch, and bolted steel top and bottom tanks for durability and ease of repair. There shall be a drain valve in the bottom tank to allow the radiator to be serviced.

There shall be a coolant overflow recovery system provided.

All radiator and heater hoses shall be silicone. Pressure compensating band clamps shall be used to eliminate hose pinching on all hoses 3/4" diameter and larger.

The cooling system shall be filled with a 50/50 mixture of water and antifreeze/coolant conditioner to provide freezing protection to minus 40 (- 40) degrees F for operation in severe winter temperatures.

The system shall include a charge air cooler with a minimum of 883 square inches of frontal area to ensure adequate cooling of the turbocharged air for proper engine operation and maximum performance. The charge air cooler core shall be 2.62" deep with seven (7) fins per inch.

Charge air cooler hoses shall be made from high-temperature wire-reinforced silicone to withstand the extremely high temperatures and pressures of the turbocharged air. The hoses shall incorporate a flexible hump section to allow motion and misalignment of the engine relative to the charge air cooler. Charge air cooler hose clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

The fan shall be 30" in diameter with eleven (11) blades for maximum airflow and dynamic balance. It shall be made of nylon for strength and corrosion resistance. A fan shroud attached to the radiator shall be provided to prevent recirculation of engine compartment air around the fan in order to maximize the cooling airflow through the radiator.

FUEL SYSTEMS

Fuel System

One (1) 50 gallon fuel tank shall be provided. The tank shall be of an all-welded, aluminized-steel construction with anti-surge baffles and shall conform to all applicable Federal Highway Administration (FHWA) 393.65 and 393.67 standards. The tank shall be mounted below the frame rails at the rear of the chassis for maximum protection. The tank shall be secured with two (2) wrap-around T-bolt type stainless steel straps. Each strap shall be fitted with protective rubber insulation and shall be secured with grade 8 hardware. This design allows for tank removal from below the chassis.

The fuel tank shall be equipped with a 2" diameter filler neck. The filler neck shall extend to the rear of the vehicle behind the rear tires and away from the heat of the exhaust system as required by NFPA 1901 Standard for Automotive Fire Apparatus. The open end of the filler neck shall be equipped with a twist-off filler cap with a retaining chain.

The tank shall be plumbed with top-draw and top-return fuel lines in order to protect the lines from road debris. Bottom-draw and/or bottom-return fuel lines are not acceptable. A vent shall be provided at the top of the tank. The vent shall be connected to the filler neck to prevent splash-back during fueling operations. A .50" NPT drain plug shall be provided at the bottom of the tank.

The tank shall have a minimum useable capacity of 50 gallons of fuel with a sufficient additional volume to allow for thermal expansion of the fuel without overflowing the vent.

A mechanical fuel pump shall be provided and sized by the engine manufacturer as part of the engine.

Fuel Line

All fuel lines shall be rubber.

ALTERNATOR

400 AMP Alternator

There shall be a 400 amp Niehoff alternator installed as specified.

The alternator shall be a 385 amp, per NFPA 1901 rating (400 amp per SAE J56), Niehoff model C712-1 brushless type with internal rectifier. The unit shall have an adjustable remote mounted solid state voltage regulator.

The alternator also has the following features:

High Output:

Output range at typical 625 rpm engine idle meets or exceeds recommended minimum continuous load requirement identified in NFPA 1901.

Long Life Bearings:

Bearings have high temperature grease and are heat stabilized for extended service life in hot engine compartments.

Electromagnetic Interference (EMI) Suppression:

Suppression shall meet SAE J1113 specifications. Will not cause interference with the vehicle`s properly designed and grounded communication equipment.

Rectifier Diodes Mounted In Front Housing:

Diode mounting in front housing shall improve reliability because entire front housing serves as rectifier heatsink.

BATTERIES

Battery System

The manufacturer shall supply six {6} heavy-duty Group 31 12-volt maintenance-free batteries. Each battery shall be installed and positioned so as to allow easy replacement of any single battery. Each battery shall be equipped with carrying handles to facilitate ease of removal and replacement. There shall be two (2) steel frame-mounted battery boxes, one (1) on the left frame rail and one (1) on the right frame rail. Each battery box shall be secured to the frame rail with

Grade 8 hardware. Each battery box shall hold three (3) batteries. The batteries shall have a minimum combined rating of 6,000{6 x 1000} cold cranking amps (CCA) @ 0 degrees Fahrenheit and 1110{6 x 185} minutes of reserve capacity for extended operation. The batteries shall have 3/8-16threaded stud terminals to ensure tight cable connections. The battery stud terminals shall each be treated with concentrated industrial soft-seal after cable installation to promote corrosion prevention. The positive and negative battery stud terminals and the respective cables shall be clearly marked to ensure quick and mistake-proof identification.

Batteries shall be placed on non-corrosive rubber matting and secured with hold-down brackets to prevent movement, vibration, and road shock. The hold-down bracket J-hooks shall be cut to fit and shall have all sharp edges removed. The batteries shall be placed in plastic trays to provide preliminary containment should there be leakage of hazardous battery fluids. There shall be two (2) plastic trays, each containing three {3} batteries. Each battery tray shall be equipped with a rubber vent hose to facilitate drainage. The rubber vent hose shall be routed to drain beneath the battery box. The batteries shall be positioned in well-ventilated areas.

One (1) positive and one (1) negative jumper stud shall be provide below the front driver side of body/pump module.

Batteries shall have a warranty of twelve (12) months that shall commence upon the date of delivery of the apparatus.

CHASSIS OPTIONS

Engine Fan Clutch

The engine shall be equipped with a thermostatically controlled engine cooling fan. The fan shall be belt driven and utilize a clutch to engage when engine reaches a specified temperature and / or the water pump is engaged (if equipped).

When disengaged, the fan clutch shall allow for improved performance from optional floor heaters, reduced cab interior noise, increased acceleration and improved fuel economy.

The fan shall be equipped with a fail safe engagement so that if the clutch fails the fan shall engage to prevent engine overheating.

Drivelines

Drivelines shall have a heavy-duty metal tube and shall be equipped with Spicer 1810 series universal joints to allow full-transmitted torque to the axle(s). Drive shafts shall be axially straight, concentric with axis and dynamically balanced.

Front Tow Eyes

Two (2) 3/4” thick heavy duty steel tow eyes shall be securely attached to the chassis frame rails at the front of the apparatus. They shall be mounted down below the bumper / cab.

Rear Tow Eyes

Two (2) heavy-duty tow eyes made of 3/4" (0.75") thick steel having 2.5" diameter holes shall be bolted directly to the rear of the frame to allow towing (not lifting) of the apparatus. The tow eyes shall be protruding into the rear compartment or out the rear of the body. The tow eyes shall be painted chassis black.

Hydraulic System

A hydraulic fixed-displacement pump system shall be provided to power all outrigger and aerial functions with direct control stations provided for each system. The hydraulic system shall be driven off the engine-driven power steering pump with an activation switch located on the cab dash within easy reach of the driver. A system "engaged" indicator light shall be provided on the activation switch. This hydraulic pump system will allow for the aerial system to be activated without having to shut down the water pump or reduce engine RPM`s. Engagement shall be allowed only with the transmission in the neutral or pump gear and the parking brake engaged. This system heats the hydraulic fluid while driving to provide smoother operation to other systems in cold climate conditions, rather than utilizing a separate pump.

CAB MODEL

LONG CAB 139inch minimum

The vehicle shall be distinguished by an all-welded aluminum and fully enclosed tilt cab. The cab shall be designed exclusively for fire/rescue service and shall be pre-engineered to ensure long life. It shall incorporate an integral welded substructure of high-strength aluminum alloy extrusions that creates an occupant compartment that is essentially a protective perimeter. The end result is a distinctive structure that is aesthetically appealing, functionally durable, and characterized by increased personnel safety.

The cab shall be constructed from 3/16" (0.188") 3003 H14 aluminum alloy plate roof, floor, and outer skins welded to a high-strength 6063-T6 aluminum alloy extruded subframe. Wall supports and roof bows are 6061 T6 aluminum alloy. This combination of a high-strength, welded aluminum inner structure surrounded on all sides by load-bearing, welded aluminum outer skins provides a cab that is strong, lightweight, corrosion-resistant, and durable.

The inner structure shall be designed to create an interlocking internal "roll-cage" effect by welding two (2) 3" x 3" x 0.188" wall-thickness 6063-T5 aluminum upright extrusions between the 3" x 3" x 0.375" wall-thickness 6061-T6 roof crossbeam and the 2.25" x 3" x 0.375" wall-thickness 6063-T6 subframe structure in the front. An additional two (2) aluminum upright extrusions within the back-of-cab structure shall be welded between the rear roof perimeter extrusion and the subframe structure in the rear to complete the interlocking framework. The four (4) upright extrusions -- two (2) in the front and two (2) in the rear -- shall be designed to effectively transmit roof loads downward into the subframe structure to help protect the

occupant compartment from crushing in a serious accident. All joints shall be electrically seam welded internally using aluminum alloy welding wire.

The subframe structure shall be constructed from high-strength 6061-T6 aluminum extrusions welded together to provide a structural base for the cab. It shall include a side-to-side C-channel extrusion across the front, with 3/4" x 2-3/4" (.75" x 2.75") full-width crossmember tubes spaced at critical points between the front and rear of the cab.

The cab floor shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate welded to the subframe structure to give the cab additional strength and to help protect the occupants from penetration by road debris and under-ride collision impacts.

The cab roof shall be constructed from 3/16" (0.188") 3003 H14 aluminum treadplate supported by a grid of fore-aft and side-to-side aluminum extrusions to help protect the occupants from penetration by falling debris and downward-projecting objects. Molded fiberglass or other molded fiber-reinforced plastic roof materials are not acceptable.

The cab roof perimeter shall be constructed from 4" x 6-5/8" (4" x 6.625") 6063-T5 aluminum extrusions with integral drip rails. Cast aluminum corner joints shall be welded to the aluminum roof perimeter extrusions to ensure structural integrity. The roof perimeter shall be continuously welded to the cab roof plate to ensure a leak-free roof structure.

The cab rear skin shall be constructed from 3/16" (0.188") 3003 H14 aluminum plate. Structural extrusions shall be used to reinforce the rear wall.

The left-hand and right-hand cab side skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate. The skins shall be welded to structural aluminum extrusions at the top, bottom, and sides for additional reinforcement.

The cab front skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate. The upper portion shall form the windshield mask, and the lower portion shall form the cab front. Each front corner shall have a full 9" outer radius for strength and appearance. The left-hand and right-hand sides of the windshield mask shall be welded to the left-hand and right-hand front door frames, and the upper edge of the windshield mask shall be welded to the cab roof perimeter extrusion for reinforcement. The cab front shall be welded to the subframe C-channel extrusion below the line of the headlights to provide protection against frontal impact.

Cab Exterior

The exterior of the cab shall be 94" wide x 139.5" long to allow sufficient room in the occupant compartment for up to ten (10) fire fighters. The cab roof shall be approximately 101" above the ground with the flat roof option. The back-of-cab to front axle length shall be a minimum of 67.5".

Front axle fenderette trim shall be brushed aluminum for appearance and corrosion resistance. Bolt-in front wheel well liners shall be constructed of 3/16" (0.188") composite material to

provide a maintenance-free, damage-resistant surface that helps protect the underside of the cab structure and components from stones and road debris.

A large stainless steel cooling air intake grille with an open area of no less than 81% shall be at the front of the cab.

The cab windshield shall be of a two-piece replaceable design for lowered cost of repair. The windshield shall be made from 1/4" (0.25") thick curved, laminated safety glass with a 75% light transmittance automotive tint. A combined minimum viewing area of 2,700-sq. in. shall be provided. Forward visibility to the ground for the average (50th percentile) male sitting in the driver`s seat shall be no more than 11 feet 7 inches from the front of the cab to ensure good visibility in congested areas.

Cab Mounts and Cab Tilt System

The cab shall be independently mounted from the body and chassis to isolate the cab structure from stresses caused by chassis twisting and body movements. Mounting points shall consist of two (2) forward-pivoting points, one (1) on each side; two (2) intermediate rubber load-bearing cushions located midway along the length of the cab, one on each side; and two (2) combination rubber shock mounts and cab latches located at the rear of the cab, one (1) on each side.

An electric-over-hydraulic cab tilt system shall be provided to provide easy access to the engine. It shall consist of two (2) large-diameter, telescoping, hydraulic lift cylinders, one (1) on each side of the cab, with a frame-mounted electric-over-hydraulic pump for cylinder actuation.

Safety flow fuses (velocity fuses) shall be provided in the hydraulic lift cylinders to prevent the raised cab from suddenly dropping in case of a burst hydraulic hose or other hydraulic failure. The safety flow fuses shall operate when the cab is in any position, not just the fully raised position.

The hydraulic pump shall have a manual override system as a backup in the event of an electrical failure. Lift controls shall be located in a compartment to the rear of the cab on the right side of the apparatus. A parking brake interlock shall be provided as a safety feature to prevent the cab from being tilted unless the parking break is set.

The entire cab shall be tilted through a 42-45 degree arc to allow for easy maintenance of the engine, transmission and engine components. A positive-engagement safety latch shall be provided to lock the cab in the full tilt position to provide additional safety for personnel working under the raised cab.

In the lowered position, the cab shall be locked down by two (2) automatic, spring-loaded cab latches at the rear of the cab. A "cab ajar" indicator light shall be provided on the instrument panel to warn the driver when the cab is not completely locked into the lowered position.

Cab Interior

The interior of the cab shall be of the open design with an ergonomically-designed driver area that provides ready access to all controls as well as a clear view of critical instrumentation.

The engine cover between the driver and the officer shall be a low-rise contoured design to provide sufficient seating and elbow room for the driver and the officer. The engine cover shall blend in smoothly with the interior dash and flooring of the cab. An all-aluminum subframe shall be provided for the engine cover for strength. The overall height of the engine enclosure shall not exceed 23” from the floor at each side and 27” in the center section. The engine cover shall not exceed 41” in width at its widest point.

The rear portion of the engine cover shall be provided with a lift-up section to provide easy access for checking transmission fluid, power steering fluid, and engine oil without raising the cab. The engine cover insulation shall consist of 3/4” dual density fiberglass composite panels with foil backing manufactured to specifically fit the engine cover without modification to eliminate ”sagging” as found with foam insulation. The insulation shall meet or exceed DOT standard MVSS 302-1 and V-0 (UI subject 94 Test).

All cab floors shall be covered with a black rubber floor mat that provides an aggressive slip-resistant surface in accordance with current NFPA 1901.

A minimum of 57.25” of floor-to-ceiling height shall be provided in the front seating area of the cab and a minimum of 55.25” floor-to-ceiling height shall be provided in the rear seating area. A minimum of 36” of seated headroom at the "H" point shall be provided over each fenderwell.

The floor area in front of the front seat pedestals shall be no less than 20.5” side to side by 25.0” front to rear for the driver and no less than 20.5” side to side by 26.0” front to rear for the officer to provide adequate legroom.

Battery jumper studs shall be provided to allow jump-starting of the apparatus without having to tilt the cab.

All exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

The interior of the cab shall be insulated to ensure the sound (dbA) level for the cab interior is within the limits stated in the current edition of NFPA 1901. The insulation shall consist of 2 oz. wadding and 1/4” (0.25”) foam padding. The padding board shall be backed with 1/4” (0.25”) thick reflective insulation. The backing shall be spun-woven polyester. Interior cab padding shall consist of a rear cab headliner, a rear wall panel, and side panels between the front and rear cab doors.

The overhead console and heater cover shall be covered with thermoformed, non-metallic, non-fiber trim pieces to provide excellent scuff and abrasion resistance, as well as chemical stain resistance. The thermoformed material shall comply with Federal Motor Vehicle Safety Standard (FMVSS) 302 for flammability of interior materials.

The vehicle shall use a seven-position tilt and telescopic steering column to accommodate various size operators. An 18” padded steering wheel with a center horn button shall be provided.

A full-width overhead console shall be mounted to the cab ceiling for placement of siren and radio heads, and for warning light switches. The console shall be made from a thermoformed, non-metallic material and shall have easily removable mounting plates.

Storage areas, with hinged access doors, shall be provided below the driver and officer seats. The driver side compartment shall be approximately 20” x 12” x 3.5” high and the officer side compartment shall be approximately 20.25” x 22.75” x 11” high (20" x 12" x 3.5" w/ air ride).

The front cab steps shall be a minimum of 8” deep x 24” wide. The first step shall be no more than 24.0” above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The rear cab steps shall be a minimum 12” deep x 21” wide. The first step shall be no more than 24.0” above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The rear steps shall incorporate intermediate steps for easy access to the cab. The steps are to be located inside the doorsill, where they are protected against mud, snow, ice, and weather. The step surfaces shall be aluminum diamond plate with a multi-directional, aggressive gripping surface incorporated into the aluminum diamond plate in accordance with current NFPA 1901.

A black rubber grip handle shall be provided on the interior of each front door below the door window to ensure proper hand holds while entering and exiting the cab. An additional black rubber grip handle shall be provided on the left and right side windshield post for additional handholds.

Cab Doors

There shall be reflective signs on each cab door in compliance with all NFPA requirements.

Four (4) side-opening cab doors shall be provided. Doors shall be constructed of a 3/16” (0.188”) aluminum plate outer material with an aluminum extruded inner framework to provide a structure that is as strong as the side skins.

Front cab door openings shall be approximately 36” wide x 71.5” high, and the rear cab door openings shall be approximately 33.75” wide x 73” high. The front doors shall open approximately 75 degrees, and the rear doors shall open approximately 80 degrees.

The doors shall be securely fastened to the doorframes with full-length, stainless steel piano hinges, with 3/8” (0.375”) diameter pins for proper door alignment, long life, and corrosion resistance. Mounting hardware shall be treated with corrosion-resistant material prior to installation. For effective sealing, an extruded rubber gasket shall be provided around the entire perimeter of all doors.

Stainless steel paddle-style door latches shall be provided on the interiors of the doors. The latches shall be designed and installed to protect against accidental or inadvertent opening as required by NFPA 1901.

The front door windows shall provide a minimum viewing area of 530 sq. in. each. The rear door windows shall provide a minimum viewing area of 500 sq. in. each. All windows shall have 75% light transmittance automotive safety tint. Full roll-down windows shall be provided for the front cab doors with worm gear drive cable operation for positive operation and long life. Scissors or gear-and-sector drives are not acceptable.

Cab Instruments and Controls

Two (2) pantograph-style windshield wipers with two (2) separate electric motors shall be provided for positive operation. Air-operated windshield wipers are not acceptable because of their tendency to accumulate moisture, which can lead to corrosion or to freezing in cold weather. The wipers shall be a wet-arm type with a one (1) gallon washer fluid reservoir, an intermittent-wipe function, and an integral wash circuit. Wiper arm length shall be approximately 28”, and the blade length approximately 20”. Each arm shall have a 70 degree sweep for full coverage of the windshield.

An overhead mounted heater and defroster with a minimum capacity of 60,000 Btu/hr and all necessary controls shall be mounted in the cab. The airflow system shall consist of two (2) levels, defrost and cab, and shall have fresh air and defogging capabilities.

Cab controls shall be located on the cab instrument panel in the dashboard on the driver`s side where they are clearly visible and easily reachable. Emergency warning light switches shall be installed in removable panels for ease of service. The following gauges and/or controls shall be provided:

• Master battery switch/ignition switch (rocker with integral indicator)
• Starter switch/engine stop switch (rocker)
• Heater and defroster controls with illumination
• Marker light/headlight control switch with dimmer switch
• Self-canceling turn signal control with indicators
• Windshield wiper switch with intermittent control and washer control
• Master warning light switch
• Transmission oil temperature gauge
• Air filter restriction indicator
• Pump shift control with green ”pump in gear” and ”o.k. to pump” indicator lights • Parking brake controls with red indicator light on dash
• Automatic transmission shift console
• Electric horn button at center of steering wheel
• Cab ajar warning light on the message center enunciator

Controls and switches shall be identified as to their function by backlit wording adjacent to each switch, or indirect panel lighting adjacent to the controls.

Fast Idle System

A fast idle system shall be provided and controlled by the cab-mounted switch. The system shall increase engine idle speed to a preset RPM for increased alternator output.

Electrical System

The cab and chassis system shall have a centrally located electrical distribution area. All electrical components shall be located such that standard operations shall not interfere with or disrupt vehicle operation. An automatic thermal-reset master circuit breaker compatible with the alternator size shall be provided. Automatic-reset circuit breakers shall be used for directional lights, cab heater, battery power, ignition, and other circuits. An access cover shall be provided for maintenance access to the electrical distribution area.

A 6 place, constantly hot, and 6 place ignition switched fuse panel and ground for customer-installed radios and chargers shall be provided at the electrical distribution area. Radio suppression shall be sufficient to allow radio equipment operation without interference.

All wiring shall be mounted in the chassis frame and protected from impact, abrasion, water, ice, and heat sources. The wiring shall be color-coded and functionally-labeled every 3” on the outer surface of the insulation for ease of identification and maintenance. The wiring harness shall conform to SAE 1127 with GXL temperature properties. Any wiring connections exposed to the outside environment shall be weather-resistant. All harnesses shall be covered in a loom that is rated at 280 degrees F to protect the wiring against heat and abrasion.

A Vehicle Data Computer (VDC) shall be supplied within the electrical system to process and distribute engine and transmission Electronic Control Module (ECM) information to chassis system gauges, the message center, and related pump panel gauges. Communications between the VDC and chassis system gauges shall be through a 4 wire multiplexed communication system to ensure accurate engine and transmission data is provided at the cab dash and pump. The VDC shall be protected against corrosion, excessive heat, vibration, and physical damage.

Two (2) dual rectangular sealed beam halogen headlights shall be installed on the front of the cab, one (1) on each side, mounted in a polished chrome-plated bezel. The low beam headlights shall activate with the release of the parking brake to provide daytime running lights (DRL) for additional vehicle conspicuity and safety. The headlight switch shall automatically override the DRL for normal low beam/high beam operation.

Cab Crashworthiness Requirement

The apparatus cab shall meet and/or exceed relevant NFPA 1901 load and impact tests required for compliance certification with the following:

Side Impact Dynamic Pre-Load per SAE J2422 (Section 5).

Testing shall meet and/or exceed defined test using 13,000 ft-lbs of force as a requirement. The cab shall be subject to a side impact representing the force seen in a roll-over. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

Cab testing shall be completed using 13,776 ft-lbs of force **exceeding** testing requirements.

Quasi-static Roof Strength (proof loads) per SAE J2422 (Section 6) / ECE R29, Annex 3, paragraph 5.

Testing shall meet and/or exceed defined test using 22,046 lbs of mass as a requirement. Testing shall be completed using platen(s) distributed uniformly over all bearing members of the cab roof structure.

Cab testing shall be completed using 23,561 lbs of mass **exceeding** testing requirements. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and doors shall remain closed.

Additional cab testing shall be conducted using 117,336 lbs of mass **exceeding** testing requirements by **over five (5) times**. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and the doors shall remain closed.

Frontal Impact per SAE J2420.

Testing shall meet and/or exceed defined test using 32,549 ft-lbs of force as a requirement. The cab shall be subject to a frontal impact as defined by the standard. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

Cab testing shall be completed using 34,844 ft-lbs of force **exceeding** testing requirements.

Additional cab testing shall be conducted using 65,891 ft-lbs of force **exceeding** testing requirements by **over two (2) times**.

The cab shall meet all requirements to the above cab crash worthiness; **NO EXCEPTIONS**.

A copy of a certificate or letter verifying compliance to the above performance by an independent, licensed, professional engineer shall be provided upon request.

For any or all of the above tests, the cab manufacturer shall provide either photographs or video footage of the procedure upon request.

ISO Compliance

The manufacturer shall ensure that the construction of the apparatus cab shall be in conformance with the established ISO-compliant quality system. All written quality procedures and other procedures referenced within the pages of the manufacturer`s Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or

indirectly impacts this process shall be strictly adhered to. By virtue of its ISO compliance the manufacturer shall provide an apparatus cab that is built to exacting standards, meets the customer`s expectations, and satisfies the customer`s requirements.

CAB ROOF TYPE

Cab Roof

The cab shall have a flat roof (non-vista).

CAB DOOR OPTIONS

Rear Cab Door Position

The cab rear doors shall be moved to the rear of the wheel opening. This door placement facilitates easier entry and egress by reducing the rear facing seat protrusion into the door opening.

The Rear door position is 58” from the center of the front axle to rear of door.

Cab Front Door Windows

Driver and officer door windows shall have the support pillar located toward the front of the window. There shall be a vent that can be opened and closed within the window itself, located towards the front.

Cab Door Locks

Each cab door shall have a manually operated door lock actuated from the interior of each respective door. Exterior of each cab door shall be provided with a barrel style keyed lock below the cab door handle.

Cab Door Locks

The cab shall have 1250 keyed door locks provided on exterior doors to secure the apparatus.

Cab Door Front Windows

The front door cab windows shall be electrically controlled. Each window shall have a switch on the door to control operation. The driver door shall have a switch panel to control each door window individually.

Cab Door Rear Windows

The rear cab door windows shall be electrically controlled. Each window shall have a switch on the door to control operation.

Cab Door Panels

The inner door panels shall be made from 14 gauge brushed finish stainless steel for increased durability. The cab door panels shall incorporate an easily removable panel for access to the latching mechanism for maintenance or service.

Cab Door Exterior Latches

All cab doors shall have ”L” style exterior door latches.

Cab Door Handle Scuff Plates

A stainless steel scuff plate shall be installed at all cab door "L" handles for added paint protection.

Cab Step Area Lighting

There shall be four (4) clear incandescent lights provided to illuminate the cab step well area. Each light shall be located on each cab door in the inboard position. Each light shall be activated by the cab door ajar circuit.

Cab Door Reflective Material

Reflective Yellow/Red material striping shall be supplied on each of the lower cab doors. The stripes shall run from the lower outer corner to the top upper corner of the panel, forming an "A" shape when viewed from the rear. The reflective material shall meet NFPA 1901 requirements.

MIRRORS

Front Brow Cab Mirror

A Stainless Steel 8” Convex, bell type mounting, (2) piece adjustable telescoping arm head #983, arm #3983. Mirror shall be mounted horizontally above the officers position to permit rapid viewing of the rear cab area.

Cab Mirrors

Two (2) Ramco model 6001FFR remote controlled aluminum mirrors shall be installed. The mirrors shall incorporate a full face main section with a convex mirror with housing, model CAS750, mounted to the top. The adjustment of main sections shall be through dash mounted switches. Location: mounted on front corners of cab

Mirrors, Heated

The cab mirrors shall be heated.

MISC EXTERIOR CAB OPTIONS

Cab Canopy Window

There shall be a fixed window provided between the front and rear doors on the officers side of the cab.

Window dimesions shall be as follows:

- 26.69"W x 24.5"H

Front Mud Flaps

Black linear low density polyethylene (proprietary blend) mudflaps shall be installed on the rear of the cab front wheelwells. The design of the mudflap shall have corrugated ridges to distribute water evenly.

Handrails

Cab door assist handrails shall consist of two(2) 1.25” diameter x 18” long 6063-T5 anodized aluminum tubes mounted directly behind each cab door opening. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2” from the mounting surface to allow a positive grip with a gloved hand.

HVAC

Air Conditioning

An overhead air-conditioner / heater system with a single roof mounted condenser shall be supplied.

The unit shall be mounted to the cab interior headliner in a mid cab position, away from all seating positions. The unit shall provide ten (10) comfort discharge louvers, four (4) to the back area of the cab and six (6) to the front. These louvers will be used for AC and heat air delivery. Two (2) additional large front louvers shall be damper controlled to provide defogging and defrosting capabilities to the front windshield as necessary.

The unit shall consist of a high output evaporator coil and heater core with one (1) high output dual blower for front air delivery, and two (2) high performance single wheel blowers for rear air delivery.

A serviceable filter shall be installed on the A/C evaporator. The filter shall consist of a steel perimeter frame with a foam filter.

The control panel shall actuate the air-distribution system with air cylinders, which are to be separated from the brake system by an 85-90 psi pressure protection valve. A three-speed blower switch shall control air speed.

The condenser shall be roof mounted and have a minimum capacity of 65,000 BTU`s and have dual fans with a built in receiver drier.

Performance Data: (Unit only, no ducting or louvers)

AC BTU: 55,000

Heat BTU: 65,000

CFM : 1300 @ 13.8V (All blowers)

The compressor shall be a ten-cylinder swash plate type Seltec model TM-31HD with a capacity of 19.1 cu.in. per revolution.

The system shall be capable of cooling the interior of the cab from 100 degrees ambient to 75 degrees or less with 50% relative humidity in 30 minutes or less.

Air Conditioning Condensor(s)

The air conditioning condenser(s) mounted on the roof of the cab shall be painted job color.

SEATS

All seats shall be Bostrom brand.

Seat, Driver

One (1) H. O. Bostrom 400 Series Sierra Air- 100RX4 suspension seats with high back styling shall be supplied for the driver position.

Features shall include:

- Air-100 suspension assembly with weight, height and ride adjustment.
- Built in lumbar support.
- 4” vertical suspension motion.
- 5” fore and aft adjustment.

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so

the male end can be easily grasped and the female end easily located while sitting in a normal position.

Seat, Officer

One (1) H. O. Bostrom 400 Series fixed seat with high back SCBA storage for the officer`s position shall be supplied.

Features shall include:

• Removable ”Store-All” side cushions.
• Auto-pivot and return headrest to open for improved exit with SCBA.
• 12.5” wide SCBA cavity to store leading SCBA Brands.
• Built in lumbar support.
• Replaceable seat, side and headrest cushions.

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

Seat, Rear Facing

One (1) Bostrom 400 Series tanker 450 SCBA high back SCBA storage seats shall be provided in the rear facing position over the officer side wheel well.

Features shall include:

• Removable ”Store-All” side cushions.
• Auto-pivot and return headrest to open for improved exit with SCBA.
• 12.5” wide SCBA cavity to store leading SCBA Brands.
• Built in lumbar support.
• Replaceable seat, side and headrest cushions.

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

Seat, Rear Wall

Two (2) Bostrom SCBA backs and a two (2) person bench style seat with a single bottom cushion shall be mounted on an aluminum seat riser or the rear wall of the cab. Each side of the seat riser shall be angled, providing sufficient legroom when entering and exiting the cab.

Features shall include:

• Removable ”Store-All” side cushions.
• Auto-pivot and return headrest to open for improved exit with SCBA.
• 12.5” wide SCBA cavity to store leading SCBA Brands.
• Built in lumbar support.
• Replaceable seat, side and headrest cushions.

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

Seat Cover Material

All seats shall have Durawear seat cover material.

Seat Fabric Color

All seats shall be gray in color.

Seating Capacity Tag

A tag that is in view of the driver stating seating capacity of five (5) personnel shall be provided.

Bostrom SecureAll Locking System

All seats shall have the H.O. Bostrom SecureAll™ SCBA Locking System, shall be one bracket model and store all U.S. and international SCBA brands and sizes while in transit or for storage on fire trucks. The bracket shall be easily adjustable; all adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the tank in-place for a safe and comfortable fit in seat cavity. Fire fighters shall simply push the SCBA unit against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ bracket shall fit in all H.O. Bostrom Tanker SCBA seats including ABTS and non-ABTS seats and all flip-up ABTS and non-ABTS seats. Additional seat depth shall not be required for proper bracket fit; changes to the shroud back shall not be required for proper mounting of the bracket.

The standard release handle shall be integrated into the seat cushion for quick and easy release and shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

The H.O. Bostrom SecureAll™ system meets NFPA 1901 standards and requirements of EN 1846-2.

The brackets shall be located in the officer's seat, rear facing officer's side seat, and rear wall seats.

MEDICAL CABINETS

Medical Storage Cabinet Driver Side Wheel Well

There shall be one (1) medical storage cabinet provided over the driver side wheel well of the cab. The medical storage cabinet shall be constructed of 1/8” (.125”) smooth aluminum plate. The medical storage cabinet shall be approximately 42” high x 22” wide x 28” deep.

There shall be two (2) adjustable shelves provided in the medical storage cabinet. The shelves shall be constructed of 1/8” (.125”) smooth aluminum plate. Each shelf shall have a 1” front and rear lip for strength and reinforcement. The shelves shall be sized to the interior dimensions of the medical storage cabinet.

The medical storage cabinet shall be accessible externally of the cab by a locking roll-up door and internally by a vertically-hinged door with a locking push-button latch.

Medical Storage Cabinet Finish

All medical storage cabinets shall have a grey finish.

Medical Cabinets Rear Wall

There shall be medical storage cabinets provided at the driver and officer side rear wall of the cab. The medical cabinet shall be constructed of 1/8" smooth aluminum plate. The medical cabinet shall be approximately 55" high (54" non-vista) x 18" wide x 12" deep exterior.

Two (2) vertically adjustable shelves shall be provided and installed in the medical cabinet. The shelves shall be constructed of 1/8" smooth aluminum plate. Each shelf shall have a 1" front for added strength and reinforcement. The shelves shall be sized to the interior dimensions of the medical cabinet. The shelves shall be mounted with extruded aluminum adjustable shelf tracking attached to the cabinet walls and the shelves to be secured with aluminum brackets to the tracks to allow for vertical height adjustment. As necessary a 3/4" x 2-3/4" aluminum extrusion shall be mounted to the underside of the shelves to provide additional reinforcement as needed.

The lower cabinet opening shall be raised approximately 12" to provide space for rear wall heaters. The raised area shall include louvers for proper ventilation of heaters and a false floor to protect heaters from contents of cabinet.

There shall be a locking roll-up door provided to secure contents.

MISC INTERIOR CAB OPTIONS

Cab Interior Color

Cab instrument panel, overhead console, trim panels, headliner, and door panels shall be gray.

Sunvisors

Padded sun visors shall be provided for the driver and officer matching the interior trim of the cab and shall be flush mounted into the underside of the overhead console.

Air Horn Lanyard

There shall be a ”Y” style lanyard mounted in the center of the cab that allows the driver and officer to operate the air horns. The lanyard shall activate an electrical air switch.

Cab Dash - Severe Duty

The center and officer side dash shall be constructed from .125" smooth aluminum plate painted to match the cab interior. A hinged access panel shall be provided on top of the center dash to provide easy access to components within.

The lower kick panels below the dash to be constructed from .125 aluminum diamond plate. The panels shall be removable to allow for servicing components that may be located behind the panels.

Engine Cover - Severe Duty

A severe duty engine cover shall be provided. The cover shall be constructed using 1/8" (.125) thick WearTrak™ floor type matting material on the forward sides, top forward area between driver and officer and top rearward area between wheel wells. 3/8" (.375) thick foam insulation shall be provided below the matting to dampen noise and vibrations. Smooth plate aluminum trim painted to match cab interior shall be provided at each transitioning area of the matting and around the engine access door.

Heat, Supplemental

A single 40,000 BTU water heater shall be supplied in the front area of the cab. The unit shall heat the lower section of the drivers and officers footwell.

Dual 23,000 BTU water heaters shall be supplied in the rear of the cab to heat the rear cab lower section.

Dual climate control will be achieved via dual switches installed on a front instrument panel.

CAB ELECTRICAL OPTIONS

Cab Dome Lights

A dome light assembly with two (2) incandescent bulbs with one (1) white lens and one (1) red lens and plastic housing shall be installed. The white light activates with appropriate cab door and light assembly mounted push-button switch, the red light activates with light assembly mounted push-button switch only.

There shall be two (2) mounted in the front of the cab, one (1) in the driver and one (1) in the officer ceiling.

There shall be two (2) mounted in the rear of the cab, one (1) in the driver side and one (1) in the officer side ceiling.

Radio

Unit shall be equipped with an AC Delco model XTA2300 AM/FM stereo CD with weather band. Two (2) Prestige model 2525 5-1/4" radio speakers and antenna shall be supplied mounted in padding adjacent to driver`s and officer`s seat.

Unit shall be suppressed from engine noise to provide clear sound through respective speakers.

Location: center overhead console offset to officer side.

Switch Horn Button Two Position

A two (2) position rocker switch shall be installed in the cab dash and properly labeled to enable operator to activate one of the following from the steering wheel horn button: OEM Traffic horn or Federal Signal Q2B.

Battery Charger Receptacle

A 20 amp battery charger receptacle shall be installed in the specified location.

The receptacle shall be located outside driver's door next to handrail

The cover color shall be Yellow

English Dominant Gauge Cluster

The cab operational instruments shall be located in the dashboard on the driver side of the cab and shall be clearly visible. The gauges in this panel shall be English dominant and shall be the following:

- Speedometer/Odometer
- Tachometer with integral hour meter
- Engine oil pressure gauge with warning light and buzzer

• Engine water temperature gauge with warning light and buzzer
• Two (2) air pressure gauges with a warning light and buzzer (front air and rear air)
• Fuel gauge
• Voltmeter
• Transmission oil temperature gauge

This panel shall be backlit for increased visibility during day and night time operations.

Headlights

The front of the cab shall have four (4) headlights. The headlights shall be mounted on the front of the cab in the lower position. The headlights shall be day time operational.

Cab Turn Signals

There shall be a pair of Federal Signal QuadraFlare model QL64Z-ARROW LED (Light Emitting Diode) turn signal light heads with populated arrow pattern and amber lens mounted upper headlight bezel and wired with weatherproof connectors.

Battery Charger

A Supersmart microprocessor controlled charging system shall be installed. The system shall have a 110 volt, 60 hertz, 5.25 amp input with output of 20 amps 12 volts DC.

The battery charging system shall be installed and connected directly to the shoreline to ensure the batteries remain fully charged while the vehicle is in the fire station or firehouse.

The system shall provide a visual signal if battery voltage drops below 11.5 volts. The microprocessor shall be continuously powered from the battery to provide the charge status.

Equalization charge shall only occur when necessary, not with every cycle. The system shall fully charge the batteries while allowing up to 8 amps of additional load for onboard systems.

Antenna Base

There shall be (2) Tessco P/N 90942 universal antenna base mounted on the cab roof with a weatherproof connector. The antenna base shall be NMO Motorola Style (equivalent to a MATM style). The antenna shall be located driver side rearward with coaxial cable terminating at the center of the dash board, and officer side rearward with coaxial cable terminating at the center of the dash board.

BODY MODEL

Aerial Body

The apparatus body shall include a single, pumper sized hosebed with a minimum volume of 49 cubic feet of useable space and a minimum length (fore-aft) of 205" for the storage of hose. Split hosebeds which require making and/or breaking hose connections to deploy and/or reload the full hose load are not acceptable because the extra time required to perform these operations would be detrimental to the efficient performance of the apparatus. Hosebeds which are less than 205" in length are not favorable because the extra number of hose folds involved to load the hose would take extra space and require extra effort. The hosebed shall be designed to permit the deployment of hose from the rearmost portion of the body while the vehicle is in motion without raising the aerial ladder from its stored position. Hosebeds which deploy hose from a position partway along the side of the body are not acceptable because of the possibility of snagging the hose or a hose coupling on the aerial ladder turntable or on a protruding portion of the body. The hosebed shall be designed to allow manual reloading of the hose from the rear, top, and side without raising the aerial ladder from its stored position. These requirements are deemed essential to the effective operation of the apparatus when pumper operations are required. **NO EXCEPTIONS TO SIDE HOSEBED CONFIGURATION.**

The body design shall have a rescue-style configuration with 26" deep lower compartments and 24" deep upper compartments that provide a total of 147.39 cu. ft. of storage. The cubic footage shall not include ladder tunnels or the hosebed.

The minimum water tank size to be considered acceptable shall be 500 gallons to support pumper operations.

The body design shall be modular to permit easy repair and remounting. An extruded aluminum body is required to provide a strong, lightweight, corrosion-resistant vehicle.

Body Construction

The apparatus body shall be constructed entirely of aluminum extrusions with interlocking aluminum plates. A modular aluminum body is required due to the high strength-to-weight ratio of aluminum, its corrosion resistance, its ease of repair, and its light weight for increased equipment carrying capacity.

The interlocking body framework shall be constructed from beveled 6061-T6 and 6063-T5 extrusions electrically seam welded both internally and externally at each joint using 5356 aluminum alloy welding wire.

All horizontal surfaces, running boards, rear step, and the vertical rear body surface shall be constructed from aluminum diamond plate.

Body Substructure

The body substructure shall be constructed of aluminum extrusions. Body designs that incorporate steel substructures connected to aluminum compartments are not as corrosion-resistant and are not acceptable.

Body substructure crossmember extrusions shall be at the front of the body and ahead of the rear wheel well. The extrusions shall be 3” x 3” 6061-T6 aluminum with 3/8” (0.375”) wall thickness. A solid 3” x 3” ”I-beam” section aluminum extrusion shall be provided the full width of the body over the rear wheel well. The crossmembers shall be designed to support the compartment framing and shall be welded to 1-3/16” x 3” (1.188” x 3”) solid 6063-T5 aluminum frame sill extrusions. The frame sill extrusions shall be shaped to contour with the chassis frame rails and shall be protected from contact with the chassis frame rails by 5/16” x 2” (0.31” x 2”) fiber-reinforced rubber strips to prevent wear and galvanic corrosion caused when two dissimilar metals come in contact.

Body Mounting System

The body shall be attached to the chassis frame rails with a series of 5/8” (0.625”) diameter steel U-bolts. The U-Bolt system shall be used to allow easy removal of the body for major repair or disassembly. Body designs that weld the body to the aerial torque box or to the chassis frame rails are not acceptable because of the stress imposed on the vehicle during road travel and aerial operations.

Water Tank Mounting System

The water tank shall be mounted on an extruded aluminum framework. The booster tank mounting system shall utilize a floating design to reduce stress from road travel and vibration. To maintain a low vehicle center of gravity, the water tank bottom shall be mounted within 5” of the frame rail top. Designs that store ground ladders under the water tank and raise the center of gravity of the vehicle shall not be acceptable.

The body design shall allow the booster tank to be completely removable without disturbing or dismounting the apparatus body structure. An extruded aluminum cradle covered with rubber shock pads and corner braces shall support the tank.

Stabilizer Openings

Body openings for the aerial stabilizers shall be located directly behind the rear wheel well opening on each side of the vehicle. The openings shall be framed in aluminum extrusions and fitted with treadplate access panels for service access to the backside of the stabilizer extension rods. The stabilizer covers shall be made from treadplate and shall be installed on the extendable stabilizers. The covers shall provide a pleasing appearance and a mounting location for red warning lights as outlined in the current edition of NFPA 1901.

Side Aerial Access Staircase

A single access staircase to the aerial ladder turntable shall be supplied on the driver`s side of the apparatus. The staircase shall incorporate a pocket-style drop-down step in the body to reduce the ground-to-staircase step height when the unit is supported on the stabilizers. The angled staircase shall be supplied with extruded aluminum handrails on both sides of the staircase frame

Access steps shall be mounted in accordance with current NFPA requirements and shall not exceed a maximum stepping height of 18”. The top surface of the step shall have a minimum of 35 sq. in. and shall have an aggressive multi-directional, slip-resistant surface. Access steps shall be able to support up to 500 lbs. Steps shall be located to provide a minimum of 8” clearance between the leading edge of the step and any obstruction.

Rear Body Design

The rear body shall be designed to provide ground ladder storage, hose deployment, and service access to aerial components. A horizontally-hinged door in the center of the rear body shall provide access to the lower turntable. An access door on each side of the service door shall provide storage for ladders and pike poles. The area under the hosebed shall provide additional storage for ground ladders. The ground ladder storage locations on the rear body shall be supplied with doors. All rear access doors shall match the rear body finish.

Fuel Fill Location

The fuel fill position shall be located at the rear of the apparatus next to the waterway inlet. The fuel tank filler neck shall be located behind a hinged door that is labeled ”Diesel Fuel Only.”

Body Top

The top of the body between the left-side compartments and the hosebed shall be an open 41” wide x 42” long x 10” deep (minimum) storage area over the water tank. This area shall be framed with 3” x 3”-3/16” (3” x 3” x 0.188”) extrusions. The floor of this storage area shall be made from 1/8” (0.125”) embossed aluminum diamond plate.

Removable embossed diamond plate around the aerial turntable shall be supplied for top service access to check the aerial hydraulic oil level, and remove the oil tank if needed.

Hosebed Construction

A single, continuous hosebed with no chutes shall be supplied on the right-hand side of the body. The hosebed shall measure a minimum of 16" deep x 26” wide x 205” long (fore-aft) to allow the use of large-diameter supply hose with a minimum number of hose folds. Shorter hosebeds will not be viewed as favorable due to the increased number of hose folds.

The hosebed compartment deck shall be constructed entirely from maintenance-free, extruded aluminum slats. The slats shall have an anodized rounded ribbed top surface. The slats shall be of alternating widths -- one (1) approximately 3/4” (0.75”) high x 7.5” wide and the other approximately 3/4” (0.75”) high x 2.75” wide -- and shall be riveted into a one-piece grid system to prevent the accumulation of water and allow ventilation to assist in drying hose. The hosebed compartment shall be free of sharp edges and projections to prevent hose damage. The compartment deck design shall incorporate a provision for the installation of adjustable hosebed dividers.

The hosebed sides shall consist of 3/16” (0.188”) 3003 H14 smooth aluminum plate welded to a perimeter frame constructed of 3” x 3” x 3/16” (3” x 3” x 0.188”) heavy-walled 6063-T5 aluminum extrusions for rigidity.

Compartment Construction

All compartment walls and ceilings shall be constructed from 1/8” (0.125”) formed aluminum 3003 H14 alloy plate. Each compartment shall be modular in design and shall not be part of the body support structure.

Compartment floors shall be constructed of 3/16” (0.187”) aluminum diamond plate welded in place. Compartment floors shall be supported by either 1.5” x 3” x 1/8” (0.125”) walled aluminum extrusions or .5” x 3” aluminum flatbar. The compartment seams shall be sealed using a permanent pliable silicone caulk. The walls of each compartment shall be machine-louvered for adequate ventilation. External compartment tops shall be constructed of 1/8” (0.125”) embossed aluminum diamond plate. Service access shall be provided to the main body wiring harnesses.

The compartment interior walls and ceiling shall be natural finish aluminum to provide a long-lasting, maintenance-free surface.

Compartment Sizes

The approximate compartment sizes and locations shall be as follows:

Left Side:
There shall be one (1) compartment (L1) behind the pump module. The compartment shall be approximately 60” wide x 31” high x 24” deep (upper) and 60” wide x 26” high x 26” deep (lower) and contain approximately 49.3 cubic feet of storage space. The door opening shall be approximately 60” wide x 61” high.

There shall be one (1) compartment (L2) over the rear wheels. The compartment shall be approximately 40.5” wide x 31” high x 24” deep and contain approximately 17.44 cubic feet of storage space. The door opening shall be approximately 40.5” wide x 31” high.

There shall be one (1) compartment (L3) over the rear wheels. The compartment shall be approximately 40.5” wide x 31” high x 24” deep and contain approximately 17.44 cubic feet of storage space. The door opening shall be approximately 40.5” wide x 31” high.

There shall be one (1) compartment (L4) behind the rear stabilizer. The compartment shall be approximately 26” wide x 31” high x 24” deep (upper) and 26” wide x 26” high x 26” deep (lower) and contain approximately 21.36 cubic feet of storage space. The door opening shall be approximately 26” wide x 61” high.

Right Side:
There shall be one (1) compartment (R1) behind the pump module. The compartment shall be

approximately 60” wide x 26” high x 26” deep and contain approximately 23.47 cubic feet of storage space. The door opening shall be approximately 60” wide x 26” high.

There shall be one (1) compartment (L2) behind the rear wheels. The compartment shall be approximately 47” wide x 26” high x 26” deep and contain approximately 18.38 cubic feet of storage space. The door opening shall be approximately 47” wide x 26” high.

Pump Module

The apparatus body shall be divided into two (2) individual sections. The pump compartment shall be a separate module from the apparatus body and hosebed compartmentation. This will allow each module to move independently of the other. The pump compartment module shall extend full width of the body.

The pump operator`s control panel and pump compartment shall be located at the front of the body. The operator`s controls and gauges shall be located on the left side (street side) of the apparatus. The compartment shall be designed following NFPA 1901 15.6.

The left and right side pump panels shall be completely removable for easy access to the pump compartment. Each panel shall be split approximately two-thirds of the way from the bottom by an anodized extrusion, which shall allow removal of the left side upper panel for easy access to gauges.

A side running board formed from1/8” aluminum diamond plate shall be provided and shall extend the full length of the pump module on each side of the apparatus. The running board shall be bolted to the pump compartment for rigidity and to provide easy removal for replacement in the case of damage.

Handrails

Access handrails shall be provided at all step positions, including, but not limited to, the rear tailboard. All body handrails shall be constructed of maintenance-free, corrosion-resistant extruded aluminum. Handrails shall be a minimum of 1.25” diameter and shall be installed between chrome end stanchions at least 2” from the mounting surface to allow for access with a gloved hand. The extruded aluminum shall be ribbed to assure a good grip for personnel safety.

The handrails shall be installed as follows:

• Two (2) 48” handrails, one (1) on each side of the aerial access stair case

Steps, Standing, and Walking Surfaces

The maximum stepping distance shall not exceed 18”, with the exception of the ground-to-first step distance, which shall not exceed 24”. The maximum ground-to-first step distance shall be maintained when the stabilizers are deployed by the use of an auxiliary set of steps installed at the aerial access staircase. All steps or ladders shall sustain a minimum static load of 500 lbs. without deformation as outlined in the current edition of NFPA 1901.

All exterior steps shall be designed with an average slip resistance of .68 when wet as measured with an English XL tester following AST F 1679 (Standard Test Method for Using a Variable Incidence Tribometer).

Apparatus Warning Labels

A label shall be supplied on the rear body to warn personnel that riding in or on the rear step is prohibited as outlined in the current edition of NFPA 1901.

A label shall be applied to both sides of the apparatus and the rear to warn operators that the aerial is not insulated.

Rubrail

The body shall have a rubrail along the length of the body on each side and at the rear. The rubrail shall be constructed of minimum 3/16” (0.188”) thick anodized aluminum 6463-T6 extrusion. The rubrail shall be a minimum of 2.75” high x 1.25” deep and shall extend beyond the body width to protect compartment doors and the body side.

The rubrail shall be of a C-channel design to allow marker and warning lights to be recessed inside for protection. The top surface of the rubrail shall have a minimum of five (5) serrations raised 0.1” high with cross grooves to provide a slip-resistant edge for the rear step and running boards. The rubrail shall be spaced away from the body using 3/16” (0.188”) nylon spacers to prevent the accumulation of dirt, road salt, and other corrosive materials. The ends of each rubrail section shall be provided with a rounded corner piece. The vertical surface inside the rubrail C-channel shall be inset with a reflective material for increased side and rear visibility.

Rear Body Platework

The rear body platework shall be flush mounted smooth 3/16” un-painted aluminum plate to facilitate rear body striping.

Auxiliary Ground Pads

Two (2) auxiliary ground pads shall be provided. The pads shall be 24” x 24” x 1/2” thick aluminum plate with a grab handle welded to the edge. The pads shall be stored in brackets that are mounted below the body.

Hosebed Depth/Capacity

A hosebed 18"D x 26"W x 205"L shall be provided. The hosebed shall hold up to 1200` of 5" LDH.

Quad Crosslay Hosebed

Four (4) crosslay hosebeds shall be provided at the front area of the body. Four (4) crosslay sections shall have a capacity for up to 250` of 1.75" double-jacket fire hose single stacked and preconnected to the pump discharge. The crosslay decking shall be constructed entirely of maintenance-free 3/4" x 2-3/4" hollow aluminum extrusions.

Stainless steel rollers with nylon guides set in aluminum extrusions shall be installed horizontally and vertically on each end of the crosslay to allow easy deployment of the hose and help protect the body paint.

Dunnage Pan

A dunnage pan constructed of 3/16" (.188") aluminum treadplate shall be located rearward of the crosslays. The dunnage pan shall be sized to maximize available storage space.

Rear Pike Pole/Attic Ladder Storage

A storage compartment shall be provided at the rear of the body for (2)6` APH6, (2)8` APH8, (2)12` APH12 pike poles and (1) FL-10 attic ladder. The pike poles and attic ladder shall be appropriately labeled and secured by a hinged aluminum plate door that matches the rear body finish.

DOORS

Double Compartment Doors Right Side

Double compartment doors shall be utilized on the right side of the body. They shall be constructed using a box pan configuration. The outer door pans shall beveled and shall be constructed from 3/16” (0.188”) aluminum plate. The inner door pans shall be constructed from 1/8” (0.125”) smooth aluminum plate and shall have nutsert fittings to attach hold-open hardware. The inner pans shall have a 95-degree bend to form an integral drip rail.

The compartment doors shall have a 1” x 9/16” (1” x 0.43”) closed-cell ”P” EPDM sponge gasket meeting ASTM D-1066 2A4 standards installed around the perimeter of the doors to provide a seal that is resistant to oil, sunlight, and ozone.

A drain hole shall be installed in the lower corner of the inside door pan to assist with drainage.

A polished stainless steel Hansen D-ring style twist-lock door handle a with #459 latch shall be provided on the primary door. The 4-1/2” (4.5”) D-ring handle shall be mounted directly to the door latching mechanism with screws that do not penetrate the door material for improved corrosion resistance. The secondary door shall have a positive latching mechanism to hold the door in the closed position.

The compartment doors shall be securely attached to the apparatus body with a full-length stainless steel 1/4” (0.25”) rod piano-type hinge isolated from the body and compartment doors

with a dielectric barrier. The doors shall be attached with machine screws threaded into the doorframe. The doors shall have a gas shock-style hold-open device.

An anodized aluminum drip rail shall be mounted over the compartment opening to assist in directing water runoff away from the compartment.

Roll Up Compartment Doors

ROM brand roll up doors with satin finish shall be provided for all left side body compartments.

The Robinson door slats shall be double wall box frame and manufactured from anodized aluminum. The slats shall have interlocking end shoes on each slat. The slats shall have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration.

The track shall be anodized aluminum with a finishing flange incorporated to provide a finished look around the perimeter of the door without additional trim or caulking. The track shall have a replaceable side seal to prevent water and dust from entering the compartment.

The doors shall be counterbalanced for ease in operation. A full width latch bar shall be operable with one hand, even with heavy gloves. Securing method shall be a positive latch device.

A magnetic type switch integral to the door shall be supplied for door ajar indication and compartment light activation.

Drip Pan

A ROM drip pan shall be supplied for each roll-up door. The drip pan shall be made from a high strength aluminum alloy. The splashguard and end caps shall be made from extruded and injection molded high-impact plastic.

COMPARTMENT STORAGE

Driver`s Side Storage System

A storage system consisting of the following components shall be installed in the driver`s side forward compartment.

Vertical Partition

There shall be a vertical partition constructed of 3/16” (.187”) smooth plate aluminum with a sanded finish. The partition shall be bolted 24” from the rearward wall.

Adjustable Mounted Roll-Out Tool Board

Two (2) heavy duty roll-out aluminum tool boards shall be provided. The tool boards shall be constructed of 3/16" (.187") smooth aluminum plate with double re-enforcing lips on the front and rear vertical edges to increase the tool board`s rigidity. The first (inward) break shall be approximately .75" and the second (outer) break shall be approximately 1.5". The tool boards shall have a sanded finish and be sized in height and depth as applicable.

The tool boards shall be mounted on drawer slides, at the top and bottom, that will permit the board to roll out of the compartment for easier access to tools and/or equipment. The slide mechanisms shall have ball bearings for ease of extension and retraction operation and dependable service. The tool boards shall be mounted at top and bottom on adjustable tracking for ease of placement. A pneumatic shock shall be utilized to secure the toolboards in the open or closed position. The capacity rating shall be 500 lb. maximum at full extension.

The tool boards shall be located to the rear of the partition wall.

Roll-Out Tray with 24" Slides

A heavy duty roll-out tray shall be provided. The roll-out tray shall be constructed of 3/16" (.187") smooth aluminum plate with a sanded finish and welded corners for increased strength and rigidity. The tray shall be sized in width and depth as applicable. For greater tray accessibility, the drawer slides shall feature one hundred percent extension. The tray shall utilize a pneumatic shock to secure the tray in the open or closed position. The tray shall have a total capacity of 500 lbs.

The tray shall be located on the floor ahead of the vertical partition.

Aluminum Shelf

The shelf shall be constructed of 3/16" (.187") smooth aluminum plate. The shelf shall have a minimum 2" front lip to accommodate optional plastic interlocking compartment tile systems. For additional strength and reinforcement of the shelf a return lip shall be provided. The shelf shall be fixed and located approximately 30" from the floor ahead of the partition and capable of holding 250 lb.

ADJUSTABLE SHELVING

The following compartments shall contain adjustable shelving in the quantities noted:

1 in the forward left side wheel well compartment, 1 in the rearward left wheel well compartment, 2 in the left rear compartment, 1 in the right front compartment and 1 in the right rear compartment.

The shelves shall be constructed of 3/16" (.187") smooth aluminum plate. The shelf shall have a minimum 2" front and rear lips to accommodate optional plastic interlocking compartment tile systems. For additional strength and reinforcement of the shelf a return break shall be provided on the outward lip. The adjustable shelf shall be capable of holding 250 lb.

The shelf shall be sized, width and depth, to match the size and location in the compartment.

COVERS

Hosebed Cover

A cover constructed of Black 18 oz. PVC vinyl coated polyester shall be installed over the apparatus hosebed. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch.

The front edge of the cover shall be mechanically attached to the body. The sides of the cover shall be held in place with heavy duty Velcro strips running the length of the hosebed. The rear of the cover shall have an integral flap that extends down to cover the rear of the hosebed. This flap shall be secured in place with heavy duty nylon straps to comply with the latest edition of NFPA 1901.

Crosslay Cover

A cover constructed of Black 18 oz. PVC vinyl coated polyester shall be installed on the apparatus crosslay. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch.

The cover shall be held in place across the top of the body by chrome snaps. The sides of the cover shall have integral flaps that extend down to cover the sides of the crosslay. The side flaps shall be secured in place to comply with the latest edition of NFPA 1901.

Crosslay Module Cover

A cover constructed of black 18 oz. PVC vinyl coated polyester shall be installed on the service access opening at the front of the pump compartment. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch.

The cover shall be held in place by twist-Lock fasteners in the corners and snaps on the sides.

PUMP MODULE

Side Mount Pump Panels

The driver and officer side pump panels shall be constructed of 14 gauge stainless steel. Each panel shall have the ability to be removed from the module for easier access and for maintenance in the pump area.

Pump Access Door

The officer side pump module shall include an upper horizontally-hinged pump access door.

The door shall be constructed of 3/16” (.187”) aluminum treadplate. The compartment door shall be securely attached with a full-length stainless steel piano type hinge with 1/4” pins. The hinge shall be ”staked” on every other knuckle to prevent the pin from sliding. The door shall include two (2) push-button style latches to secure the door in the closed position and two (2) hold-open devices to hold the door in the open position.

Pump Panel Tags

Color coded pump panel labels shall be supplied to be in accordance with NFPA compliance.

PUMP MODULE OPTIONS

Pump Compartment Heaters

Two (2) 25,000 Btu heaters shall be installed in the pump compartment area. The heaters shall be connected to the chassis engine coolant system and shall include a 12 volt blower. The heaters shall be controlled at the pump operators panel.

Air Horn Switch

A heavy duty, weatherproof, push button switch shall be installed at the pump operator`s panel to operate the air horns.

The switch shall be labeled ”Evacuation Alert” and located at the driver side pump panel.

WATER TANK

Booster Tank

The booster tank shall be T-shaped in configuration and shall have a useable capacity of 500 gallons (U.S.). The tank sides, top, and bottom shall be constructed of 1/2” (0.50”) black UV-stabilized copolymer polypropylene for high strength, corrosion resistance, and long life.

The tank shall be constructed utilizing latest thermoplastic welding technology. A clean, hot air controlled temperature process shall ensure that the weld reaches its plasticized state without cold or hot spots.

The tank shall undergo extensive testing prior to installation in the truck. The process shall include an electronic spark and waterfill test after both the internal and external tank shell welds are completed.

The tank shall have a combination vent and manual fill tower. The tower shall be located in the left front corner of the tank. The tank overflow shall be 4” diameter (3" may be provided on aerial applications) and shall dump behind the rear wheels to permit maximum traction. The tower shall have a hinged cover and a 1/4” (0.25”) thick polypropylene screen.

There shall be two (2) standard tank openings; one (1) for the tank-to-pump suction line with an anti-swirl plate, and one (1) for the tank fill line.

Baffles, both longitudinal and latitudinal, shall be interlocking and thermo welded to minimize water surge during travel, enhancing road handling stability. Openings in the baffles shall be positioned to allow waterflow to NFPA standards during filling or pumping operations.

The tank shall be supported in an aluminum cradle resting on the frame on fiber-reinforced rubber strips to prevent wear and galvanic corrosion caused when two dissimilar metals come it contact. The tank shall be completely removable without disturbing or dismounting the apparatus body structure.

A lifetime manufacturer`s limited warranty shall be included. **NO EXCEPTION TO TANK CAPACITY OF 500 GALLONS.**

TANK PLUMBING

Tank Fill 2 Akron Valve

One (1) 2” pump-to-tank fill line having a 2” manually operated full flow valve. The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times. The fill line shall be controlled using a chrome handle with an integral tag.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Tank to Pump 3 Akron Valve

One (1) manually operated 3” Akron valve shall be installed between the pump suction and the booster tank in order to pump water from the tank. The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

LADDER STORAGE / RACKS

Bracket Horizontal Ladder

Extension ladder mounting assembly shall consist of a 1/8” diamond plate boot bolted to the compartment top and a chrome plated handle to secure the ladder into the boot.

Location and type of ladder: over L1 for Little Giant model 17

Ground Ladder Storage

Two (2) ground ladder storage areas shall be provided at the rear of the apparatus -- one (1) vertical compartment under the left-hand side of the aerial ladder turntable and one (1) horizontal compartment under the hosebed at the right-hand side of the vehicle. Combined with the body or aerial mounted ladders, they shall provide storage for a minimum of 115` of ground ladders in order to exceed the requirements of the current edition of NFPA 1901 for both aerial ladders and quints.

The vertical compartment under the left-hand side of the aerial ladder turntable shall be approximately 8.5” wide x 25” high x 205” deep and shall be accessible through a door at the rear of the apparatus. The bottom of this compartment shall be no more than 55” above the ground with the vehicle in the unloaded condition to allow easy removal of the ladders.

The horizontal compartment under the hosebed at the right-hand side of the vehicle shall be approximately 26” wide x 205” deep and shall be accessible through a door at the rear of the apparatus. The bottom of this compartment shall be no more than 52” above the ground with the vehicle in the unloaded condition to allow easy removal of the ladders.

The ladders in the vertical and horizontal compartments shall be held captive top and bottom by aluminum tracks and shall slide on friction-reducing material. All ladders shall be removable individually without having to remove any other ladder.

The ladder rack shall hold: (1)PEL3-35, (1)PEL-28, (1)PRL-16 & (4)12` APH12 pike poles.

HANDRAILS / STEPS

Driver Side Folding Steps

(3) Heavy duty folding steps shall be located at the driver side front compartment face next to the pump panel. The folding steps shall meet current NFPA requirements for step height and surface area.

One (1) handrail shall be installed in compliance with current NFPA. The handrail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

Officer Side Intermediate Pump Panel Step

An intermediate pump panel step with one (1) lower and one (1) upper folding step with one (1) handrail shall be provided.

The intermediate step shall be constructed of 3/16" (.187") aluminum treadplate. The step shall include a multi-directional, aggressive gripping surface incorporated into the treadplate. The surface shall extend vertically from the diamond plate sheet a minimum of 1/8" (.125"). Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". The step shall be bolted onto the pump module and be easily removable for replacement in the case of damage.

One (1) 4" recessed mounted light shall be provided on the officer side front compartment face. The light shall be positioned above the step to provide illumination of the upper surface of the step.

Heavy-duty folding steps shall be positioned one (1) below and one (1) above the intermediate step. The folding steps shall meet current NFPA in step height and surface area.

One (1) handrail shall be installed in compliance with current NFPA. The handrail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

Bolt On Tailboard

There shall be a tailboard at the rear of the apparatus. The tailboard shall be bolted to the body for ease of replacement and shall feature a multi-directional, aggressive gripping surface incorporated into the tread plate. The surface shall extend vertically from the diamond plate sheet a minimum of 1/8" (.125"). Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4".

An assist handrail shall consist of one (1) 1-1/4" OD 6063T5 anodized aluminum tube mounted between chrome stanchions. The handrail shall be machine extruded with an integral ribbed surface to assure a good grip for personnel safety.

A 4" circular single bulb light shall be mounted under the body on the passenger side. The light shall be wired to the work light switch on the cab dash. The light shall be in a resilient shock

absorbent mount for improved bulb life. The wiring connections shall be made with a weather-resistant plug in style connector.

Slide-out Platforms

A slide-out platform shall be provided integral with each pump panel running board adjacent to the pump panel. The platform shall be 21” deep and shall be constructed of 1/8” (0.125”) aluminum treadplate with a multi-directional, aggressive gripping surface. The platform shall utilize a maintenance-free slide system incorporating stainless steel shoulder bolts that slide in slotted heavy-wall aluminum angles. Notches shall be provided at each end of the slots to hold the platform in both the extended and retracted positions.

MISC BODY OPTIONS

Rear Mud Flaps

The rear tires shall have a set of black mud flaps mounted behind the rear chassis wheels.

Hosebed Capacity

The hosebed shall have the capacity to store at minimum the following hose from the driver side to the officer side:
300 ft of 2-1/2” hose and 1000ft of 4”LDH hose.

Hosebed Divider

There shall be a hosebed divider provided the full fore-aft length of the hosebed.

The hosebed divider shall be constructed of 1/4” (0.25”) smooth aluminum plate with an extruded aluminum base welded to the bottom. The rear end of the divider shall have a 3” radius corner to protect personnel. The divider shall be natural finish aluminum for long-lasting appearance and shall be sanded and deburred to prevent damage to the hose.

The divider shall be adjustable from side to side in the hosebed to accommodate varying hose loads.

Hosebed Divider Hand Hold

There shall be a hand hole cutout on the trailing edge of each hosebed divider. The cutout is specifically sized for use in adjusting of the hosebed divider.

Overall Height Restriction

The apparatus shall have a maximum overall height of 11ft 5inches.

Overall Length Restriction

The unit shall have a maximum overall length of 37ft 7inches.

Body Wheel Well

The body wheel well frame shall be constructed from 6063-T5 aluminum extrusion with a slot the full length to permit an internal fit of 1/8" (0.125") aluminum treadplate. The wheel well trim shall be constructed from 6063-T5 formed aluminum extrusion. The wheel well liners shall be constructed of a 3/16" (.187") composite material. The liners shall be bolt-on and shall provide a maintenance-free and damage-resistant surface.

SCBA BOTTLE STORAGE

SCBA Storage

Four (4) SCBA bottle storage compartments shall be provided. The compartments shall be 8" diameter by 25" deep and located two (2) each side in the body wheel well area.

Each SCBA bottle shall be held in place by a hinged cast aluminum door with a positive latch.

The inner SCBA storage tube shall be made of high strength polyethylene to provide additional protection to the surface of the SCBA bottles. Each tube to include a ribbed rubber insert mounted to rear of tube.

PUMPS

Pump System

The pump shall be a midship mounted Waterous CSU 1500-2250 single stage centrifugal pump. The pump shall be mounted on the chassis frame rails and shall be split drive driven.

The entire pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 psi (207 (MPa). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump body shall be horizontally split in two (2) sections, for easy removal of impeller assembly including wear rings and bearings from beneath the pump without disturbing pump mounting or piping.

The pump impeller shall be hard, fine grain bronze of the mixed flow design and shall be individually ground and hand balanced. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wrap-around double labyrinth design for maximum efficiency.

The impeller shaft shall be stainless steel, accurately ground with a 2-3/4" dia. spline shaft, and shall be rigidly supported at each end by oil or grease-lubricated anti-friction ball bearings for

rigid and precise support. Bearings shall be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. The remaining bearings shall be heavy -duty, deep groove ball bearings in the gearbox and shall be splash lubricated. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of the gearbox.

Two (2) 6.0" diameter suction ports with 6" NST male threads and removable screens shall be provided, one each side. The ports shall be mounted one (1) on each side of the midship pump and shall extend through the side pump panels. Inlets shall come equipped with long handle chrome caps.

Stuffing boxes shall be integral with the pump body and be equipped with two-piece glands to permit adjustment or replacement of packing without disturbing pump. Lantern rings shall be located at inner ends of stuffing boxes so that all rings of pacing can be removed without removal of the lantern rings. Water shall be fed into stuffing box lantern rings for proper lubrication and cooling when pump is operating.

Discharge Manifold

The pump system shall utilize a stainless steel discharge manifold system that allows a direct flow of water to all discharge valves. The manifold and fabricated piping systems shall be constructed of a minimum of Schedule 10 stainless steel, to reduce corrosion.

The apparatus manufacturer shall provide a full 10 year stainless steel plumbing components warranty. This warranty shall cover defects in materials or workmanship of apparatus manufacturer designed foam/water plumbing system stainless steel components for 10 years. A copy of the warranty document shall be provided with the proposal.

Priming System

The oil free electrically driven priming pump shall be a positive displacement vane type. One (1) priming control, located at the pump operator`s position, shall open the priming valve and start the priming motor. The priming valve shall be electronically interlocked to the "Park Brake" circuit to allow priming of the pump before the pump is placed in gear.

Pump Shift

The pump shift shall be pneumatically controlled using a power shifting cylinder.

The power shift control valve shall be mounted in the cab, and be labeled "PUMP SHIFT". The apparatus transmission shift control shall be furnished with a positive lever, preventing accidental shifting of the chassis transmission.

A green indicator light shall be located in the cab, and be labeled "PUMP ENGAGED". The light shall not activate until the pump shift has completed its full travel into pump engagement position.

A second green indicator light shall be located in the cab and be labeled ”OK TO PUMP”. This light shall be energized when both the pump shift has been completed and the chassis automatic transmission has obtained converter lockup (4th gear lockup).

System

Two (2) test plugs shall be pump panel mounted for third party testing of vacuum and pressures of the pump.

A master drain valve shall be installed and operated from the pump operator`s panel. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal and turning handle.

The manual Master Drain Valve shall have six individually sealed ports that allow quick, simultaneous, draining of multiple intake and discharge lines. It shall be constructed of corrosion resistant material and be capable of operating at a pressure of up to 600 psi

The master drain shall provide independent ports for low point drainage of the fire pump and auxiliary devices.

Auxiliary Engine Cooler

An engine cooler used to lower engine water temperature during prolonged pumping operations and controlled at the pump operator`s panel shall be provided.

The engine cooler shall be installed in the engine coolant system in such a manner as to allow cool pump water to circulate around engine water, thus forming a true heat exchanger action. Cooler inlet and outlet shall be continuous, preventing intermixing of engine coolant and pump water.

Pump Rating

The fire pump shall be rated at 2000 GPM.

PUMP CERTIFICATION

Pump Certification

The pump, when dry, shall be capable of taking suction and discharging water in accordance with current NFPA 1901. The pump shall be tested at the manufacturer`s facility by an independent, third-party testing service. The conditions of the pump test shall be as outlined in current NFPA 1901.

The tests shall include, at a minimum, the pump test, the pumping engine overload test, the pressure control system test, the priming device tests, the vacuum test, and the water tank to pump flow test as outlined in current NFPA 1901.

A piping hydrostatic test shall be performed as outlined in current NFPA 1901.

The pump shall deliver the percentage of rated capacities at pressures indicated below:

100% of rated capacity at 150 psi net pump pressure
100% of rated capacity at 165 psi net pump pressure
70% of rated capacity at 200 psi net pump pressure
50% of rated capacity at 250 psi net pump pressure

A test plate, installed at the pump panel, shall provide the rated discharges and pressures together with the speed of the engine as determined by the certification test, and the no-load governed speed of the engine.

A Certificate of Inspection certifying performance of the pump and all related components shall be provided at time of delivery. Additional certification documents shall include, but not limited to, Certificate of Hydrostatic Test, Electrical System Performance Test, Manufacturer`s Record of Pumper Construction, and Certificate of Pump Performance from the pump manufacturer.

PUMP OPTIONS

Steamers Flush+1

The pump 6" Steamer/Intake(s) shall be mounted approximately 1” from the pump panel to back of cap when installed. The "Flush+1" dimension can vary + or - 1 1/4" or as practicable depending on the pump module width and options selected(Example 72" or 76" modules).

Location: driver's side, officer's side

Pump Seal Packing Waterous

A pump packing shall be supplied with the pump and shall include stuffing boxes which shall be integral with the pump body and be equipped with two-piece glands to permit adjustment or replacement of packing without disturbing pump. Lantern rings shall be located at inner ends of stuffing boxes so that all rings of pacing can be removed without removal of the lantern rings. Water shall be fed into stuffing box lantern rings for proper lubrication and cooling when pump is operating.

Pump Cooler

The pump shall have a 3/8” line installed from the pump discharge to the booster tank to allow a small amount of water to circulate through the pump casing in order to cool the pump during sustained periods of pump operation when water is not being discharged. The pump cooler line shall be controlled from the pump operator`s panel by a 3/8” snubber valve.

Master Drain Manual

A manual master drain valve shall be installed and operated from the driver side. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal.

The manual Master Drain Valve shall have twelve (12) individually-sealed ports that allow quick and simultaneous draining of multiple intake and discharge lines. It shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 PSI.

The master drain shall provide independent ports for low point drainage of the fire pump and auxiliary devices.

INTAKES

Left Intake 2.5 Akron Valve

One (1) 2 1/2" suction inlet with a manually operated 2 1/2" Akron valve shall be provided on the left side of the apparatus at the pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The outlet of the valve shall be connected to the suction side of the pump with the valve body located behind the pump panel. The valve shall come equipped with a brass inlet strainer, 2 1/2" NST female chrome inlet swivel and shall be equipped with a chrome-plated, rocker-lug plug with a retainer device.

The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

A 3/4" bleeder valve assembly will be installed on the left side pump panel.

Right Intake 2.5 Akron Valve

One (1) 2-1/2" gated suction inlet with a manually operated Akron valve shall be installed in the right side pump panel with the valve body behind the panel. The valve control shall be located at the intake and shall visually indicate the position of the valve at all times.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self locking

ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The outlet of the valve shall be connected to the suction side of the pump with the valve body located behind the pump panel. The valve shall come equipped with a brass inlet strainer, 2-1/2" NST female chrome inlet swivel and shall be equipped with a chrome-plated, rocker-lug plug with a retainer device.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

A 3/4" bleeder valve assembly will be installed on the right side pump panel.

INTAKE OPTIONS

Intake Relief Valve

The pump shall be equipped with an Akron style 59 cast brass, variable-pressure-setting relief valve on the pump suction side. It shall be designed to operate at a maximum inlet pressure of 250 psi. The relief valve shall be normally closed and shall be set to begin opening at 125 psi in order to limit intake pressures in the pumping system. When the relief valve opens, the overflow water shall be directed through a plumbed outlet to discharge below the apparatus body in an area visible to the pump operator. The overflow outlet shall terminate with a male 2-1/2" NST threaded fitting to allow the overflow water to be directed away from the vehicle with a short hose (supplied by the fire department) during freezing weather or under other conditions where an accumulation of water around the apparatus might be hazardous.

DISCHARGES AND PRECONNECTS

Front Jumpline 1.5 Akron Valve

One (1) 1-1/2" preconnect outlet with a manually operated Akron valve shall be supplied to the extended front bumper. The preconnect shall consist of a 2" heavy-duty hose coming from the pump discharge manifold to a 2" FNPT x 1-1/2" MNST mechanical swivel hose connection to permit the use of the hose from either side of the apparatus.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

An air blowout valve shall be installed between the chassis air reservoir and the front jump line. The control shall be installed on the pump operator`s panel.

The discharge shall be supplied with a Class 1 automatic 3/4" drain valve assembly. The automatic drain shall have an all-brass body with stainless steel check assembly. The drain shall normally be open and automatically close when the pressure is greater than 6 psi.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Swivel in Tray

There shall be a brass swivel provided for the front bumper discharge located in hose tray center front bumper centered on lower back wall.

Left Front 2.5 Hosebed Akron Valve

One (1) 2-1/2" preconnect outlet with a manually operated Akron valve shall be supplied to the lower left of the apparatus hosebed. The preconnect shall consist of a 2-1/2" heavy-duty hose coming from the pump discharge manifold to a 2-1/2" adapter.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Discharge 4 Waterway w/3 Akron Handwheel

One (1) 4" discharge outlet with a 3" handwheel operated Akron valve shall be connected from the pump discharge to the aerial waterway.

The valve shall be an Akron 8600HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The handwheel valve control shall have the following features:

• Handwheel driven worm gear rotates a gear sector for smoother and easier operation under pressure.
• A 50:1 ratio
• 4” handwheel
• 12 1/2 turns for full open/close.
• Opening and closing speed complies with the current edition of NFPA.
• Portrait position indicator which shows the position of the valve ball to meet NFPA 1901.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

1.5 Crosslays Akron Valve

Four (4) single crosslay discharges shall be provided at the front area of the body. Each crosslay shall include one (1) 2” brass swivel with a 1-1/2” hose connection to permit the use of hose from either side of the apparatus.

The crosslay hosebed shall consist of a 2” heavy-duty hose coming from the pump discharge manifold to the 2” swivel. The hose shall be connected to a manually operated 2” Akron valve. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Left Panel 2.5 Discharges Akron Valve

Two (2) 2-1/2" discharge outlets with a manually operated Akron valve shall be provided at the left hand side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Right Panel 2.5 Discharge Akron Valve

One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be provided at the right side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: right side discharge 2

Discharge 3 Right Panel Akron Handwheel

One (1) 3" discharge outlet with a handwheel operated Akron valve shall be provided at the right side pump panel.

The valve shall be an Akron 8600HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The handwheel valve control shall have the following features:

• Handwheel driven worm gear rotates a gear sector for smoother and easier operation under pressure.
• A 50:1 ratio
• 4” handwheel
• 12 1/2 turns for full open/close.
• Opening and closing speed complies with the current edition of NFPA.
• Portrait position indicator which shows the position of the valve ball to meet NFPA 1901.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: right side discharge 1

DISCHARGE OPTIONS

Bleeder Drain Valves

Each discharge shall be supplied with a 3/4” bleeder valve assembly. The bleeder valve shall be installed to drain water from the gauge pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

PRESSURE GOVERNORS

Pressure Governor

The apparatus shall be equipped with a Class 1 engine/pump pressure governor/throttle system connected directly to the Electronic Control Module (ECM) mounted on the engine. The governor shall control and monitor the pump master discharge pressure, eliminating any need for a relief valve on the discharge side of the pump. A special preset feature shall permit a predetermined pressure or RPM to be set and hold it against varying flow rates at independent discharge lines by modulating engine rotation speed. Control of the engine speed shall be

dictated by preprogrammed software in the electronic control module. The preset shall be easily adjustable by the operator.

The Class 1 system shall be installed in place of the discharge relief valve and the pump panel mounted hand throttle.

A display/control until shall be mounted on the pump operator`s panel. The control unit shall be a self-contained, weatherproof module, approximately 4.5”W x 6”H. The display unit shall provide alpha-numeric display.

GAUGES

Tank Level Gauges

Two (2) Class 1 brand Intelli-Tank ™ water tank level gauges shall be installed, one at the pump operator`s panel and one at the officers side pump panel to provide wide angle viewing and a high-visibility display of the water tank level. Four (4) ultra-bright LED`s (light emitting diodes) on the display module allow the full, 3/4, 1/2 and refill levels to be easily distinguished at a glance.

The long life and extreme durability of LED indicators eliminates light bulb replacement and maintenance. Color coded cover plates shall complete the assembly of the display module.

The system shall calibrate to any size and shape of tank and has a built-in diagnosis feature. It comes complete with an industrial pressure transducer, which will provide nine (9) accurate levels of indications. Each display also has a programmable night dimming feature.

Engine Gauge Package

A gauge package shall be supplied at the pump operator`s panel to monitor the vehicle`s engine. The weatherproof package shall include the following:

• Tachometer - to monitor engine revolutions per minute.
• Oil pressure gauge - to monitor engine oil pressure.
• Water temperature gauge - to monitor the engine water temperature.
• Voltmeter - connected to the vehicle electrical system.
• Engine alarm system - Two (2) warning lights, one (1) to indicate low oil pressure and one (1) to indicate high water temperature, and a buzzer alarm for audible warning.

Master Pressure Gauges

(2) Span weatherproof 4-1/2” compound vacuum pressure gauges with a range of 30-0-600 shall be installed on the pump panel for master intake and discharge gauges. The gauge shall be filled with a liquid solution.

Compound Pressure Gauge

Each discharge shall be supplied with a Span weatherproof 2-1/2" compound vacuum pressure gauge with a range of 30-0-600 shall be installed on the pump panel. The gauge shall be filled with a liquid solution to assure visual reading to within 1% accuracy.

ELECTRICAL SYSTEMS

Multiplex Electrical System

The following specifications describe the low voltage electrical system on the specified fire apparatus. The electrical system shall include all panels, electrical components, switches and relays, wiring harnesses and other electrical components. The electrical equipment installed by the apparatus manufacturer shall conform to current automotive electrical system standards, the latest Federal DOT standards, and the requirements of the applicable NFPA #1901standards.

The apparatus shall have multiplexing system, to provide diagnostic capability. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The electrical system shall be pre-wired for computer modem accessibility to allow service personnel to easily plug in a modem to allow remote diagnostics, troubleshooting, or program additions.

For superior system integrity, the networked system shall meet the following minimum requirement components:

- Power management center
- Load shedding power management
- Solid-state circuitry
- Switch input capability
- Responsible for lighting device activation
- Self-contained diagnostic indicators
- Power distribution module

All wiring shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10 percent. The wiring and wiring harness and insulation shall be in conformance to applicable SAE and NFPA standards. The wiring harness shall conform to SAE J-1128 with GXL temperature properties. All exposed wiring shall be run in a loom with a minimum 289 degree Fahrenheit rating. All wiring looms shall be properly supported and attached to body members. The electrical conductors shall be constructed in accordance with applicable SAE standards, except when good engineering practice requires special construction.

The wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection and shall be installed in accordance with the device manufacturer`s

instructions. Electrical connections shall be with mechanical type fasteners and large rubber grommets where wiring passes through metal panels.

The wiring between the cab and body shall be split using Deutsche type connectors or enclosed in a terminal junction panel area. This system will permit body removal with minimal impact on the apparatus electrical system. All connections shall be crimp-type with heat shrink tubing with insulated shanks to resist moisture and foreign debris such as grease and road grime. Weather-resistant connectors shall be provided throughout to ensure the integrity of the electrical system.

Any electrical junction or terminal boxes shall be weather-resistant and located away from water spray conditions. In addition, the main body junction panel shall house the automatic reset breakers and relays where required.

There shall be no exposed electrical cabling, harnesses, or terminal connections located in compartments, unless they are enclosed in an electrical junction box or covered with a removable electrical panel. The wiring shall be secured in place and protected against heat, liquid contaminants and damage. Wiring shall be uniquely identified at least every two feet (2`) by color coding or permanent marking with a circuit function code and identified on a reference chart or electrical wiring schematic per requirements of applicable NFPA #1901standards.

The electrical circuits shall be provided with low voltage overcurrent protective devices. Such devices shall be accessible and located in required terminal connection locations or weather-resistant enclosures. The overcurrent protection shall be suitable for electrical equipment and shall be automatic reset type and meet SAE standards. All electrical equipment, switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. The system shall have electro-magnetic interference suppression provided as required in applicable SAE standards.

The electrical system shall include the following:

a) Electrical terminals in weather exposed areas shall have a non-conductive grease or spray applied. A corrosion preventative compound shall be applied to all terminal plugs located outside of the cab or body.

b) The electrical wiring shall be harnessed or be placed in a protective loom.

c) Heat shrink material and sealed connectors shall be used to protect exposed connections.

d) Holes made in the roof shall be caulked with silicone. Large fender washers shall be used when fastening equipment to the underside of the cab roof.

e) Any electrical component that is installed in an exposed area shall be mounted in a manner that will not allow moisture to accumulate in it.

f) A coil of wire must be provided behind an electrical appliance to allow them to be pulled away from mounting area for inspection and service work.

g) All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

The warning lights shall be switched in the chassis cab with labeled switching in an accessible location. Individual rocker switches shall be provided only for warning lights provided over the minimum level of warning lights in either the stationary or moving modes. All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the operator. For easy nighttime operation, an integral indicator light shall be provided to indicate when the circuit is energized. All switches shall be appropriately identified as to their function.

A single warning light switch shall activate all required warning lights. This switch will allow the vehicle to respond to an emergency and ”call for the right of way”. When the parking brake is activated, a ”blocking right of way” system shall be automatically activated per requirements of NFPA #1901. All ”clear” warning lights shall be automatically shed on actuation of parking brake.

NFPA Required Testing of Electrical System

The apparatus shall be electrical tested before completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of NFPA #1901. The following minimum testing shall be completed by the apparatus manufacturer:

1. Reserve capacity test:

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test fail.

2. Alternator performance test at idle:

The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

3. Alternator performance test at full load:

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer`s governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during this test. However, an alarm sounded by excessive battery discharge, as detected by the system required in NFPA #1901 Standard, or a system voltage of less than 11.7 volts dc for a 12 volt nominal system, for more than 120 seconds, shall be considered a test failure.

4. Low voltage alarm test:

Following the completion of the above tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts dc for a 12 volt nominal system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

NFPA Required Documentation

The following documentation shall be provided on delivery of the apparatus:

a. Documentation of the electrical system performance tests required above.
b. A written load analysis, including:

1. The nameplate rating of the alternator.
2. The alternator rating under the conditions.
3. Each specified component load.
4. Individual intermittent loads.

Vehicle Data Recorder

Data Recorder

A vehicle data recorder system shall be provided to comply with NFPA 1901, 2009 edition. The following data shall be monitored:

- Vehicle speed MPH
- Acceleration (from speedometer) MPH/Sec.
- Deceleration (from speedometer) MPH/Sec.
- Engine speed RPM
- Engine throttle position % of full throttle
- ABS Event On/Off
- Seat occupied status Occupied Yes/No by position
- Seat belt status Buckled Yes/No by position
- Master Optical Warning Device Switch On/Off
- Time 24 hour time
- Date Year/Month/Day

Occupant Detection System

There shall be a visual and audible warning system installed in the cab that indicates the occupant buckle status of all cab seating positions that are designed to be occupied during vehicle movement.

The audible warning shall activate when the vehicle's park brake is released and a seat position is not in a valid state. A valid state is defined as a seat that is unoccupied and the seat belt is unbuckled, or one that has the seat belt buckled after the seat has been occupied.

The visual warning shall consist of a graphical display that will continuously indicate the validity of each seat position.

The system shall include a display panel with LED back-lit ISO indicators for each seating position, seat sensor and safety belt latch switch for each cab seating position, audible alarm and braided wiring harness.

The display panel shall be located officer's overhead.

LIGHT BARS

Light Bar

A Federal Signal model 535NFPA6P2 six pod Viewpoint LED light system shall be provided. The system shall include two (2) individual three pod units.

Each three pod unit shall have five (5) SOL-6 red LED reflectors, two (2) SOL-6 white LED reflectors.

The lens configuration shall be R/C/R/R/C/R. Pods 2 & 5 shall be switched off in the blocking the right of way mode.

The lightbar(s) shall be installed in the following location: front cab corners

WARNING LIGHT PACKAGES

Lower Level Warning Light Package

Ten (10) Federal Signal QuadraFlare LED light heads with red lenses and bezels shall be provided.

The rectangular lights shall be wired with weatherproof connectors and shall be mounted as close to the corner points of the apparatus as is practical as follows:

• Two (2) QL64XF-R lights on the front of the apparatus facing forward
• Two (2) QL64XF-R lights on the rear of the apparatus facing rearward
• Two (2) QL64XF-R lights each side of the apparatus, one (1) each side at the forward most point (as practical), and one (1) each side at the rearward most point (as practical).
• One (1) QL64XF-R light each side of the apparatus centrally located to provide mid ship warning light.

The side facing lights shall be located at forward most position, on side of cab down low just ahead of rear door, and on rear fixed outrigger cover.

All warning devices shall be surface mounted in compliance with NFPA standards.

Lower Level LED Warning Light Flash Rate

The lower level Federal Signal Qudraflare LED warning lights shall be set to flash at an alternating 75 quad flashes per minute.

WARNING LIGHTS

Upper Rear Warning Lights

Two (2) Federal Signal Model IVP100 Individual Vector Pods shall be supplied. Each unit shall consist of a 175 FPM rotating light. The dome colors to be Red, Red.

The lights shall be located each side of pump module offset to the rear, rear upper body on aerial style brackets to meet Zone C upper requirements.

Preemption Emitter

A Tomar model EMIT3 preemption emitter with chrome plated housing shall be installed.

The emitter shall be located front of cab above grille.

Hazard (Door Ajar) Light

There shall be a 2.5” red incandescent hazard light installed as specified.

The light shall be located center overhead.

DIRECTIONAL LIGHT BARS

Directional Traffic Warning Light

A Federal SML6 Signal Master light bar with amber lens shall be installed at the rear of the apparatus. The unit shall include a total of six (6) 27 watt dual lamp halogen modules. Four operating modes are available: left arrow, right arrow, split (center/out) and a flashing warn pattern. A Federal SMC-56 control shall be provided. LEDS shall emulate the warning pattern.

Light bar dimensions: 31.5L x 3.5D x 3.0H

Directional Light Bar Control Location

The directional light bar control head shall be located in the center overhead.

SIRENS

Electronic Siren

A Federal PA300 siren model 690010 solid state electronic siren with attached noise-canceling microphone shall be installed. The unit shall be capable of driving a single high power speaker up to 200 watts to achieve a sound output level that meets Class ”A” requirements.

Operating modes shall include Hi-Lo, yelp, wail, P.A., air horn and radio re-broadcast.

The siren shall be recessed mounted in the cab.

Electronic Siren Control Location

The electronic siren control shall be located in the center overhead console offset to driver side.

Mechanical Siren

A chrome plated flush mounted Federal Q2B-NN coaster siren shall be installed in the front bumper. An electric siren brake switch shall be located on the main cab switch panel.

The siren shall be located driver side front bumper.

SPEAKERS

Speaker

One (1) Federal model ES100 Dynamax 100 watt speaker shall be flush-mounted as far forward and as low as possible on the front of the cab. A polished Model MSFMT-EF ”Electric F” grille shall be provided on the outside of the speaker to prevent road debris from entering the speaker. Speaker dimensions shall be: 5.5 in. high x 5.9 in. wide x 2.5 in. deep. Weight = 5.5 lbs.

The speaker shall produce a minimum sound output of 120 db(A) at 10 feet to meet current NFPA 1901 requirements.

The speaker shall be located officer side front bumper inboard of frame.

DOT LIGHTING

License Plate Light

One (1) Truck-Lite Model 15905 white LED license plate light mounted in a Truck-Lite Model 15732 chrome-plated plastic license plate housing shall be mounted at the rear of the body.

LED Marker Lights

LED clearance/marker lights shall be installed as specified.

Upper Cab:
• Five (5)amber LED clearance lights on the cab roof.

Lower Cab:
• One (1) amber LED side turn/marker each side of cab ahead of the front door hinge.

Upper Body:
• One (1) red Trucklite LED clearance light each side, rear of body to the side.

Lower Body:
• Three (3) red Trucklite LED clearance lights centered at rear, recessed in the rubrail.
• One (1) red Trucklite LED clearance light each side at the trailing edge of the apparatus body, recessed in the rubrail.
• One (1) amber Trucklite LED clearance light each side front of body just in front of rear wheels, recessed in the rubrail.
• One (1) amber Trucklite LED clearance/auxiliary turn light each side front of body, recessed in the rubrail.

Tail Lights

One (1) Federal Signal model QL64Z-BTT red L.E.D. (Light Emitting Diode) light, one (1) Federal Signal model QL64Z-ARROW amber LED light and one (1) Federal Signal QL64Z-BACKUP white LED light shall be installed in a Cast 3 housing in a horizontal position each side at rear and wired with weatherproof connectors.

Light functions shall be as follows:

• L.E.D. red running light with red brake light in upper position.
• L.E.D. amber populated arrow pattern turn signal in middle position.
• L.E.D. white backup light in lower position.

A one-piece polished aluminum trim casting shall be mounted around the three (3) individual lights in a horizontal position.

LIGHTS - COMPARTMENT, STEP & GROUND

Medical Cabinet Lighting

Two (2) ROM V3 LED compartment light strips shall be mounted in each cab medical cabinet for a total of 6 lights. The bars shall be located on either side of the doors.

The light bar shall include super bright white LEDs (16 per 12” strip) mounted to circuit boards that have acrylic conformal coating for corrosion protection. The LED curcuit boards shall be mounted to an extruded aluminum base with lexan lens. The light shall be waterproof up to 1 meter (3.3 feet).

The light shall be controlled by a compartment door switch.

Compartment Light Package

Two (2) R.O.M. V3 compartment light strips shall be mounted in each body compartment, one on either side of the door.

Each light bar shall include sixteen (16) super bright white LEDs per foot mounted to circuit boards that have acrylic conformal coating for corrosion protection. The LED curcuit boards shall be mounted to an extruded aluminum base with lexan lens.The lights shall be waterproof up to 1 meter (3.3 feet).

Compartment lights shall be wired to a master on/off rocker switch on the cab switch panel.

The wiring connection for the compartment lights shall be made with a weather-resistant plug in style connector. A single water- and corrosion-resistant switch with a polycarbonate actuator and sealed contacts shall control each compartment light. The switch shall allow the light to illuminate if the compartment door is open.

Step Lights

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the steps around the apparatus in accordance with current NFPA requirements. The lights shall be 4” circular with clear lenses (2" if space is limited) mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather resistant plug in style connector.

The step lights shall be switched from the cab dash with the work light switch.

Ground Lights

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the ground areas around the apparatus in accordance with current NFPA requirements. The lights shall be 4” circular with clear lenses mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather-resistant plug in style connector.

Ground area lights shall be switched from the cab dash with the work light switch.

One (1) ground light shall be supplied under each side of the front bumper extension if equipped.

Lights in areas under the driver and crew area exits shall be activated automatically when the exit doors are opened.

LIGHTS - DECK AND SCENE

Hosebed Light

A Truck-Lite rectangular light shall be installed at the front area of the hosebed to provide hosebed lighting per current NFPA 1901. The rectangular rubber housing shall contain a 12-volt 2700 candlepower halogen floodlight bulb. The hosebed light shall be switched with work light switch in the cab.

Crosslay Light

A Truck-Lite rectangular light shall be installed at the rear area of the crosslay to provide crosslay lighting per current NFPA 1901. The rectangular rubber housing shall contain a 12-volt 2700 candlepower halogen floodlight bulb. The hosebed light shall be switched with work light switch in the cab.

Scene Lights

Two (2) Federal GHSCENE lights with clear lenses shall be provided. Each light shall include (2) 20 watt halogen fixtures within the light housing. Both lights, within each housing, shall be adjustable horizontally and vertically to provide desired coverage. All electrical connectors are to be enclosed in the housing providing protection against the elements.

Lights shall be located up high on rear access door and switch in the cab.

Deck/Scene Light Wired to Back-up

The rear GHSCENE scene lights shall also be activated when the chassis is placed in reverse to provide additional lighting, in addition to the back-up lights, when backing the vehicle.

LIGHTS - NON-WARNING

Engine Compartment Light

There shall be lighting provided in compliance with NFPA to illuminate the engine compartment area.

Pump Compartment Light

An incandescent light shall be provided in the pump compartment area for NFPA compliance. The light shall be wired to operate with the work light switch in the cab.

Pump Panel Light Package

Three (3) Weldon #2030 lights shall be mounted under a light shield directly above each pump panel. The work light switch in the cab shall activate the lights when the park brake is set.

Map Light

A Federal ”Little Light” map light shall be supplied. The map light shall be 12 volt with 18” flexible gooseneck with a on/off switch and matte black finish. It shall be located at officer's A post.

Handheld Spotlight

A specialty #2150 hand held spotlight with mounting bracket shall be provided. It shall be hardwired and located at the officer`s side of the cab dash.

CONTROLS / SWITCHES

Foot Switch

A heavy-duty metal floor-mounted foot switch shall be installed to operate the Q2B siren warning device. It shall be located officer's side.

Rocker Switch

A 12 volt rocker switch shall be installed and located officer's side overhead console for Q2B brake.

CAMERA

Backup Camera

A Safety Vision Back-Up Camera model SV-625B-Kit, color monitor model SV-CLCD70B, and the control box model SV-CBB56-70 shall be installed. The monitor shall be installed on the front console area visible at night and in bright sunlight to the driver. The camera shall be mounted up high at the rear of the vehicle to provide a wide angle rear view. The system shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator.

A diamond plate shield shall be installed over the rear camera to prevent damage.

MISC ELECTRICAL

Alternating Headlights

The chassis high beam headlights shall alternately flash and shall be controlled by a rocker switch mounted inside the cab.

Back-up Alarm

An electronic back-up alarm shall be supplied. The 97 dB(A) alarm shall be wired into the chassis back-up lights to signal when the vehicle is in reverse.

GENERATOR

Hydraulic Generator

A Smart Power model HR-8 top mount style 8000 watt hydraulic generator shall be provided. Generator location: dunnage pan rear of pump module offset to driver side.

The unit shall come equipped with: modular generator unit (which includes the hydraulic motor and filter, generator, and cooler), axial piston hydraulic pump, hydraulic reservoir, and a gauge panel.

The gauge panel shall display voltage, hour meter, frequency, and amperage.

The hydraulic motor, generator, blower, cooler, and necessary hydraulic components shall be mounted in a rugged steel case.

The modular generator unit shall be 32” long x 13.50” wide x 17.00” high and weigh approximately 220 pounds.

The hydraulic pump shall be driven by a chassis transmission mounted power take off (PTO).

A PTO engage switch and generator control switch shall be mounted on the cab instrument panel to engage the PTO and start the generator.

Ratings and Capacity

Rating:	8000 watts continuous 9000 watts peak
Volts:	120/240 volts
Phase:	Single, 4 wire
Frequency:	60 Hz
Amperage:	66 amps @ 120 volts or 33 amps @ 240 volts

Engine speed at engagement: Recommend below 1000 RPM
Operation range: 800 to 2100 RPM

Testing

The generator shall be tested in accordance with current N.F.P.A. 1901standards.

Notes:
*All ratings and capacities shall be derived utilizing current NFPA 1901 test parameters.
*Extreme ambient temperatures could affect generator performance.

GENERATOR TEST

3rd Party Generator Testing

The generator shall be tested at the manufacturer`s facility by an independent, third-party testing service. The conditions and testing of the generator shall be as outlined in current NFPA 1901.

The test shall include operating the generator for two hours at 100% of the rated load. Power source voltage, amps, frequency shall be monitored. The prime mover`s oil pressure, water temperature, transmission temperature (if applicable) and power source hydraulic fluid temperature (if applicable) shall be monitored during testing.

The results of the test shall be recorded and provided with delivery documentation.

BREAKER BOXES

Breaker Panel

A twelve (12) place breaker box with up to twelve (12) appropriately sized ground-fault interrupter circuit breakers shall be supplied. The breaker box will include a master breaker sized according to the generator output. The breaker box will be located in the L1 compartment on the forward wall.

Note: If generator is 5.5KW or less, the main breaker will occupy 2 places, leaving 10 available.

Dimensions: 17.92” high x 14.25” wide x 3.75” deep.

LIGHTS - QUARTZ

Quartz Lights

(2) Kwik-Raze model 36 Magnafire quartz light heads with 750-watt, 120-volt halogen bulb shall be instaleed, one on either side at the rear of the cab. They shall be rated at 19,200 Lumens

and mounted on a Kwik-Raze model 500-W/2 bottom raising aluminum telescopic pole with up indicator switch.

The light assembly shall be externally mounted as specified. The pole shall allow for 360-degree rotation of the light. A locking knob shall hold the pole at the desired height.

ELECTRIC CORD REELS

Electric Cord Reel

Hannay electric cord reel(s) (ECR 1616-17-18) shall be installed and located ceiling mount turntable access door area..

The reel(s) shall include 200`of black 10 gauge 3 conductor type SOWA cord. The cord shall be rated at 20 amps @ 110 volts. The end of the cord shall be terminated for the installation of a department required connector.

Cord Reel Rollers

Stainless steel cord reel rollers shall be installed and located on the reel.

The rollers shall facilitate smooth removal of the electric cord.

Cord Reel Rewind Switch

A heavy duty rubber covered electric reel rewind button shall be installed rear of body near the cord reel.

AERIAL MODEL

75 Aerial Ladder

Performance

A 75` telescopic aerial ladder of the open-truss design shall be installed at the rear of the vehicle with the aerial ladder pointed forward when it is in the travel position. The aerial ladder shall meet or exceed the requirements of the current edition of NFPA 1901, Sections 19.2 through 19.6 and Sections 19.17 through 19.25.

The aerial ladder shall consist of three (3) telescopic ladder sections capable of operating from minus (-) 8 degrees to plus (+) 76 degrees elevation at any ladder extension to give a full range of movement. The aerial ladder shall be designed to provide continuous egress for firefighters and civilians from any angle of elevation to the ground as defined in the current edition of NFPA 1901.

The aerial ladder shall have a rated vertical height of 75` measured in a vertical plane from the outermost rung of the outermost fly section to the ground with the ladder at maximum elevation and extension as defined in the current edition of NFPA 1901.

The aerial ladder shall have a rated horizontal reach of 67.8` measured in a horizontal plane from the centerline of the turntable rotation to the outermost rung of the outermost fly section with the aerial ladder extended to its maximum horizontal reach as defined in the current edition of NFPA 1901.

The aerial ladder shall utilize a single pair of stabilizers - one (1) on the left and one (1) on the right opposite each other - with a maximum horizontal stabilizer spread of 16` across the centerlines of the footpads. Aerial ladders which require two (2) sets of extending stabilizers or that have a maximum stabilizer spread greater than 16` are not acceptable because of the need to utilize the aerial ladder in confined areas. Aerial ladders that require a set of drop down jacks behind the cab are not acceptable. This type of configuration decreases compartment space and increases the overall vehicle weight, causing increased bending load on the chassis. In addition, it raises the water tank, which affects the overall center of gravity of the truck. **NO EXCEPTIONS.**

The aerial ladder shall have a rated tip capacity of 550 lbs. when the ladder is unsupported at full extension and 0 degrees elevation as defined by the current edition of NFPA 1901. This capacity may take the form of firefighters wearing personal protective gear, people being rescued, equipment, or any combination of loads not to exceed the rated tip capacity. The rated tip capacity shall include to an allowance of 50 lbs. for equipment mounted at the tip of the ladder. Ladders which have a rated NFPA tip capacity of less than 550 lbs. are not acceptable because of the need to utilize the aerial ladder for rescue operations in which two (2) personnel may be on the tip at the same time. **NO EXCEPTIONS.**

The ladder shall be able to provide full operating capacities in up to 35 mph wind conditions.

Aerial Ladder Construction

To ensure a high strength-to-weight ratio, high heat resistance, and an inherent corrosion resistance, the aerial ladder shall be constructed entirely of extruded high-strength aluminum alloy..

All side rails, rungs, handrails, uprights and K-braces shall be made of structural 6061-T6 aluminum alloy extrusions. All material shall be tested and certified by the material supplier. All ladder sections shall be semi-automatically welded by inert gas shielded-arc welding methods using 5356 aluminum alloy welding wire. Structural rivets or bolts shall not be utilized in the ladder weldment sections.

Due to the unpredictable nature of fireground operations, a minimum safety factor of 2.5 to 1 is desired. This structural safety factor shall apply to all structural aerial components including turntable and torque box stabilizer components. Definition of the structural safety factor shall be as outlined in NFPA 1901 A.19.20.1: **NO EXCEPTIONS**

BIDDER COMPLIES

YES | NO

DL = Dead load stress. Stress produced by the weight of the aerial device and all permanently attached components.
RL = Rated capacity stress. Stress produced by the rated capacity load of the ladder.
WL= Water load stress. Stress produced by nozzle reaction force and the weight of water in the water delivery system.
FY = Material yield strength. The stress at which material exhibits permanent deformation.

2.5 x DL + 2.5 x RL + 2 x WL equal to/less than FY

The minimum NFPA specification is exceeded in this paragraph by requiring safety margin above 2 to 1 while flowing water.

The stability factor or tip over safety margin shall be a minimum of 1.5 to 1 as defined by NFPA 1901 19.21.

An independent, third-party engineering firm shall verify both the structural safety factor and the stability factor. Design verification shall include computer modeling and analysis, and extensive strain gauge testing performed by an independent registered professional engineer. Written certification from the independent, third-party engineering firm shall be made available by the manufacturer upon request from the purchaser. **NO EXCEPTIONS**

All welding of aerial components -- including the aerial ladder sections, turntable, torque box, and outriggers -- shall be performed by welders who are certified to American Welding Society Standards D1.1, D1.2 and D1.3 as outlined in the current edition of NFPA 1901. **NO EXCEPTIONS**.

The weldment assemblies of each production unit shall be tested visually and mechanically by an ASNT-certified level II non-destructive test technician to comply with the current edition of NFPA 1901. Testing procedures shall conform to the American Welding Society Standard B1.10 Guide for non-destructive testing. Test methods include a thorough visual inspection of each weld and the use of dye penetrates where applicable.

Each ladder section shall consist of two (2) extruded aluminum side rails and a combination of aluminum rungs, tubular diagonals, verticals, and two (2) full-length handrails. The rungs on all sections shall be K-braced for maximum lateral stability. This K-bracing shall extend to the center of each rung to minimize ladder side deflection.

The ladder rungs shall be spaced on 14” centers and shall be designed with an integral skid-resistant surface to eliminate the need for rubber rung covers. A ”D” shaped rung shall be utilized to provide a larger step surface at low angles and a more comfortable grip at elevated positions. The larger step surface is critical to distribute the load on the bottom of the firefighters` foot. Round rungs are not acceptable as they increase the stress load on the foot and are more likely to cause bruising. The minimum design load of each rung shall be 500 lbs. distributed over a 3-1/2” (3.5”)-wide area in the center of the length of the rung as required in the current edition of NFPA 1901. **NO EXCEPTIONS.**

To provide a wide working area with an easy-to-grasp handrail, the aerial ladder shall exceed the requirements of the current edition of NFPA 1901 regarding the minimum ladder section inside width and the minimum handrail height by providing the following inside widths and handrail heights:

A fly section width of at least 25" is required to allow a 24" wide stokes basket to fit between the handrails.

Section	**Width**	**Height**
Base Section	37-5/8"	22-7/8"
Second Section	30-3/4"	19-3/8"
Fly Section	25-3/16"	16-1/4"

Ladder Extension/Retraction Mechanism

Both power extension and power retraction shall be furnished and shall meet the requirements of the current edition of NFPA 1901. Extension and retraction shall be by way of two (2) hydraulic cylinders mounted on each side of the base section of the aerial ladder. Each cylinder shall have a 3-1/4" (3.25") bore and a 59-1/2" (59.5") stroke.

The cylinders shall operate through a block and tackle cable arrangement to extend and retract the ladder. Maximum extension of the ladder is to be automatically limited by the stroke of the cylinders. The normal operating cable safety factor shall be 5.0 to1 and the stall safety factor shall be 2.0 to1 based on the breaking strength of the cables. The minimum ratio of the diameter of the block and tackle sheave to the diameter of the cable shall be 12.0 to 1 to allow smooth operation and reduce bending stresses on the cables. The cables shall be treated with Pre-Lube 6 for increased service life.

The cable sizes shall be as follows:

2nd section (4 cables - 2 extend, 2 retract)	7/16" 6 x 19 galvanized cable
Fly section (4 cables - 2 extend, 2 retract)	1/4" 7 x 19 galvanized cable

The aerial ladder sections shall slide within each other. Nylatron NSM pads shall be utilized between each section to minimize friction. Four (4) C-type interlocking load transfer stations shall enclose the pads. The transfer stations shall be located at the upper portion of the base and the second ladder sections.

Aerial Extension Indicator

Reflective tape stripes shall be installed on the aerial ladder handrail of the base section to indicate extension in 10` increments. A reflective dot on the base of the second section shall provide a visual reference for the operator to estimate aerial elevation.

Aerial Finish

To reduce maintenance expense, the aerial ladder shall have a natural aluminum swirled finish. This will also allow visible inspection of all ladder weld joints without having to remove paint or body filler to reveal the weld bead. Ladders finished with paint or with any other material that covers the base metal and weld joints are not acceptable.

Operation Times

The aerial ladder shall complete the elevation-extension-rotation test described in the current edition of NFPA 1901 in not more than 120 seconds or less. **NO EXCEPTIONS.** This test involves raising the aerial from the bedded position to full elevation and extension and rotating it 90 degrees. This test is to begin with the stabilizers deployed.

In addition to completing the test described above, the aerial ladder shall be capable of performing the following operations in the times noted:

Time to extend ladder	maximum 35 seconds
Time to retract ladder	maximum 25 seconds
Time to raise ladder	maximum 20 seconds
Time to lower ladder	maximum 30 seconds
Time to rotate 180 degrees	maximum 55 seconds

Aerial Ladder Rated Capacities

ALL PROPOSALS MUST INCLUDE A COPY OF THE LOAD CHART THAT WILL BE DISPLAYED ON THE COMPLETED AERIAL WITH THE PROPOSAL.

The aerial ladder shall have a rated capacity of 550 lbs. when the ladder is unsupported at full extension and 0 degrees elevation as defined by the current edition of NFPA 1901. This rated capacity consists of a 500 lb personnel rating and a 50 lb. equipment rating. The 50 lb. capacity for the equipment is for mounted equipment at the tip. This capacity may take the form of firefighters wearing personal protective gear, people being rescued, equipment, or any combination of loads not to exceed the rated tip capacity. The rated tip capacity shall be in addition to an allowance of 50 lbs. for equipment mounted at the tip of the ladder.

A sign mounted at the base of the aerial ladder shall communicate the aerial ladder capacity ratings for the following configurations when the ladder is in the unsupported, fully extended configuration while maintaining a 2.5 to 1 safety margin. These capacities may take the form of firefighters wearing personal protective gear, people being rescued, equipment, or any combination of loads not to exceed the rated capacities. For purposes of this sign, it shall be assumed that each person weighs 250 lbs. In no case shall the actual combined weights of personnel, equipment, and other loads exceed the rated capacities. The loads for each configuration are in addition to an allowance of 50 lbs. for equipment mounted at the tip of the ladder.

Condition #1- Tip load only, no water flowing

Elevation	Capacity	Pounds
-8 to 40 degrees	2 people	500 lbs.
41 to 49 degrees	3 people	750 lbs.
50 to 76 degrees	4 people	1000 lbs.

Condition #2- Distributed loads no water flowing (These include one person at the tip)

Elevation	Capacity	Pounds
-8 to 30 degrees	3 people	750 lbs.
31 to 45 degrees	5 people	1250 lbs.
46 to 76 degrees	8 people	2000 lbs.

Condition #3- Ladder tip load while flowing 1000 gpm with pre-piped waterway

Elevation	Capacity	Pounds
-8 to 76 degrees	2 people	500 lbs.

Hydraulic System

Hydraulic power for all aerial ladder operations shall be supplied by the positive displacement power steering pump mounted on the vehicle engine to provide consistent pressure and rapid response. The pump shall operate both the vehicle power steering system and the aerial ladder hydraulic system. It shall draw hydraulic fluid from a single reservoir, ensuring that the hydraulic fluid is circulated and warmed while the vehicle is responding to an incident, thus protecting the aerial ladder hydraulic system from extreme cold. The system design shall allow the aerial hydraulic system to be engaged at any engine speed without damaging the system. This is necessary to allow engagement of the aerial when pumping water at maximum capacity. The pump shall be able to supply 13 gpm of hydraulic fluid at a maximum pressure of 3,000 psi. The hydraulic system shall normally operate between 1,000 and 2,500 psi. It shall have flow controls to protect hydraulic components and it shall incorporate a relief valve set at 2,800 psi to prevent over-pressurization.

The hydraulic fluid reservoir shall consist of a 52 gallon tank mounted to the torque box and plumbed to the suction side of the hydraulic pump. The tank shall be supplied with a removable top to allow access to the tank strainer filter. There shall be ports for a return line and a tank drain on the reservoir. The reservoir fill cap shall be marked ”Hydraulic Oil Only”. Gated valves under the tank shall facilitate filter changes. The hydraulic fluid reservoir shall have sufficient volume and be mounted in such a manner to minimize heat build up and meet the performance requirement in the current edition of NFPA 1901.

An interlock device shall be provided to prevent activation of the aerial ladder hydraulic pump until either the transmission is placed in neutral and the parking brake is set, or the transmission is placed in drive and the rear driveline is disengaged as outlined in NFPA 19.17.3.

All hydraulic components with non-sealing moving parts, whose failure could result in the movement of the aerial, shall have a minimum burst strength of four (4) times the maximum

operating pressure to which the component is subjected in order to comply with the current edition of NFPA 1901.

All hydraulic components with dynamic sealing parts, whose failure could result in the movement of the aerial, shall not begin to extrude or otherwise fail at pressures at or below two (2) times the maximum operating pressure to which the component is subjected in order to comply with the current edition of NFPA 1901.

All hydraulic hoses and fittings shall have a minimum burst strength of at least three (3) times the maximum operating pressure to which the component is subjected in order to comply with the current edition of NFPA 1901.

All hydraulic tubing shall be made of stainless steel whenever possible. It shall have a minimum burst strength of four (4) times the maximum operating pressure to which it is subjected in order to exceed the requirements of the current edition of NFPA 1901. Hydraulic systems composed primarily of hose or galvanized steel lines shall not be acceptable due to the higher maintenance requirements of the system over the life of the vehicle. **NO EXCEPTIONS**

A hydraulic oil pressure gauge and an aerial hour meter shall be supplied at the aerial ladder control station as required by the current edition of NFPA 1901.

The hydraulic system shall use 5w-20 multi-weight, SAE 32 grade oil. It shall incorporate the following filters in order to remove contaminants and provide dependable service:

Reservoir Breather: 10-micron
Magnetic Reservoir Strainer: 125-mesh
Pressure Filter (Torque Box): 3-micron
Return Filter: 10-micron

The aerial ladder hydraulic system shall be designed in such a manner that a hydraulic pump failure or line rupture shall not allow the aerial or outriggers to lose position. Hydraulic holding valves shall be mounted directly on the hydraulic cylinders. To ensure reliable performance of holding valves, hoses shall not be permitted between a holding valve and cylinder. **NO EXCEPTIONS.**

The aerial shall incorporate the use of stainless steel tubes inside the torque box and jack legs to minimize the possibility of hydraulic leaks.

Hydraulic power to the ladder shall be transferred from the torque box by a hydraulic swivel fitting.

Auxiliary Hydraulic Pump

The hydraulic system shall include an auxiliary 12-volt hydraulic pump powered by the chassis electrical system in case the vehicle engine or the primary hydraulic pump fails . The auxiliary pump shall allow operation at reduced speeds to store the aerial device and retract the outriggers

for road transportation. Self-centering switches shall be provided at the turntable and at each stabilizer control station to operate the auxiliary system.

Forward Aerial Support

The aerial ladder support shall be constructed from 7/8" thick steel plate. Bolt-in diagonal bracing shall be installed on the support structure in an "X" pattern to restrict to side movement. This design shall allow for a pre-determined amount of flex preventing premature failure that can be found in an overly rigid structure. The support shall be located behind the rear wall of the cab and shall be bolted to the frame rails to allow removal in case of accidental damage.

Aerial Torque Box

In order to maximize structural strength and vehicle stability while minimizing rear axle weight, a vertical cylindrical aerial torque box shall be used. Vehicles utilizing horizontal square aerial torque boxes are not acceptable because the heavy weight of these designs conflicts with the goal of utilizing a single rear axle.

The aerial torque box shall be welded from 10” x 28.5 lbs./ft. A36 grade structural steel channels with 3/8” (0.375”) thick top and bottom plates and 3/8” (0.375”) thick integral bulkheads. The pedestal shall be a 24” outside diameter cylinder with a 3/8” (0.375”) wall and shall connect the rotation bearing mounting plate to the torque box.

The aerial torque box pedestal assembly shall be bolted to the chassis frame with sixteen (16) 3/4” (0.75”) diameter Grade 8 bolts. It shall be utilized to mount the stabilizers and the reservoir for the aerial hydraulic system.

Stabilization System

The vehicle shall come equipped with an out-and-down stabilization system. The system shall consist of two (2) hydraulically-operated out-and-down style stabilizers welded to the torque box and mounted under the frame for a low center of gravity.

The stabilizers shall have a maximum spread of 16` across the centerlines of the footpads when fully extended. The internal stabilizer tubes shall be 8” x 10” with 1/2” thick top and bottom plates and 5/8” thick sides. They shall be made of steel with a 100,000-psi minimum yield strength and shall be extended out by hydraulic cylinders. The external stabilizer tubes shall be 9-3/4” x 11-3/4” with 3/8” wall thickness. The internal tubes shall slide on low friction pads.

The stabilizers shall provide the vehicle with a tip-over safety margin of 1.5 times the rated aerial ladder load in any position the aerial ladder can be placed when the vehicle is on a firm and level surface.

The aerial shall be able to sustain a 1-1/3 to 1 rated load on a 5 degree slope downward in the position most likely to cause overturning as outlined in NFPA 1901 19.21.3.1. The maximum grade the apparatus can be set up on is 6.8 degrees (12 percent). On a 6.8-degree (12 percent)

grade, the apparatus can be leveled within a 3.4 degree (6 percent) operating range with the apparatus cab facing uphill.

The stabilizer extension cylinders shall have a 2.5” bore and a 51.5” stroke. The stabilizer lift cylinders shall be mounted on the end of the stabilizer tube and shall have a 4” bore and a 22” stroke.

The stabilizer cylinders shall be supplied with dual pilot-operated check valves on each stabilizer cylinder to hold the cylinder either in the retracted (stowed) or the extended (working) position should a hydraulic line be severed at any point in the hydraulic system. Stabilizers shall contain safety lock valves. This assures there will be no ”leak down” of stabilizer legs. Mechanical pins are not required. This feature contributes to efficient set-up and field operation.

Each stabilizer leg shall have a 1/8” thick bright aluminum diamond plate shield, full height and width of the stabilizer opening, attached to the end of the leg. This plate shall serve as a protective guard and a mounting surface for the stabilizer warning lights. The top, forward, and rear edges shall be flanged for added strength. Each stabilizer shall have one (1) red warning light mounted on the outboard face of the protective guard.

The stabilizers shall be connected to a warning light in the cab to warn the operator when the stabilizers are deployed. A floodlight shall be provided in each stabilizer body opening to illuminate the stabilizer and the ground. The light shall automatically come on with the deployment of a stabilizer.

The ground contact area for each stabilizer shall be a 12” diameter circular disc without auxiliary stabilizer pads and a 24” x 24” square plate with auxiliary stabilizer pads deployed. The ground pressure shall not exceed 75 psi when the apparatus is fully loaded and the aerial device is carrying its rated capacity in every position. This shall be accomplished with the auxiliary stabilizer pads deployed.

Stabilizer Controls

The main stabilizer control panel shall be located on the rear of the apparatus to control the operation of the stabilization system. The panel shall be labels ”JACKS” and shall provide a master on-off power switch and indicator light, two (2) yellow indicator lights - one (1) for the left jack and one (1) for the right jack - to signify when each jack is fully extended and is in firm contact with the ground, a green interlock indicator light to signify when both jacks (stabilizers) are set, and a manual transfer switch to allow the operator to manually shift the hydraulic power from the jacks (stabilizers) to the ladder once the interlock light is green.

Horizontal extension and vertical lift of the stabilizers shall be controlled by two (2) switches - one (1) for the left stabilizer and one (1) for the right stabilizer - located at the rear of the apparatus just above the brake light on each side, so that the operator may observe the stabilizers during deployment. In operation, the stabilizer on each side must be fully extended horizontally before hydraulic power is automatically shifted to the vertical lift cylinder to level the vehicle. An audible alarm with a minimum 87 dbA shall sound while the stabilizers are in motion as

required by the current edition of NFPA 1901. Stabilizer deployment from the stored position to the operating position shall be completed in less than 60 seconds. **NO EXCEPTION**

Two (2) switches to activate the auxiliary hydraulic pump shall also be provided - one (1) on each side below the stabilizer switch - to retract the stabilizers in case the main hydraulic pump fails. The stabilizer switch and the auxiliary hydraulic pump switch on each side shall be protected from impacts by an inverted U-shape d guard made from aluminum diamond plate.

Two (2) switches - one (1) on each stabilizer leg - shall sense when the leg is in firm contact with the ground. This condition shall be indicated on the main stabilizer control panel by a yellow indicator light for each side.

Leveling of the apparatus shall be performed manually by the operator using two (2) color-coded level indicators at the rear of the apparatus in order to ensure a visual confirmation that it is safe to operate the aerial ladder. The indicator for the front-to-rear level shall be located inside the aerial ladder turntable stairwell on the left side of the vehicle near the rear. The indicator for the side-to-side level shall be located above the rubrail on the rear of the vehicle near the rear suction inlet.

The aerial ladder hydraulic system shall be provided with an interlock that prevents rotation of the aerial ladder until both the stabilizers are down and properly set. Additionally, the system shall not permit stabilizer movement unless the aerial ladder is seated in the forward aerial support cradle in the travel position. The interlock system shall have a manual override with access through a door at the rear of the truck.

Upper Turntable

The upper turntable assembly shall connect the aerial ladder to the turntable bearing. It shall be fabricated from 3/8” A-572 grade 50 steel and shall have a mounting position for the aerial elevation cylinders, the ladder connecting pins, and the upper turntable operator`s position.

One (1) 34-1/4” diameter turntable bearing with a 3” drive gear face shall be bolted to the top of the bearing mounting plate with twenty-six (26) 3/4” diameter Grade 8 plated bolts. Gear teeth shall be stub tooth form. The rated overturning moment of the turntable bearing shall be a minimum of 238,000 ft-lbs.

The operator`s turntable platform shall be constructed of 3/16” aluminum treadplate with ”Gator Grip” non-skid integral surface mounted on a tubular frame. The platform shall extend from the left side of the aerial control station to the right side ladder rail. The platform shall extend 23” from the pedestal control station base, with a width of approximately 18”. The rear of the platform shall extend approximately 19” back from the turntable gear pedestal and shall be approximately 40” wide at the rear. The platform shall be fastened by grade 8 bolts. Two (2) tubular steel handrails, each with an anti-slip finish, shall be installed on the on the right and left sides of the turntable platform. Two (2) Fire Research brand ManSaver bars, equipped with tubular padding, shall be installed between the railings. The bars shall lift up and inward (towards the ladder) permitting easy entrance to the ladder and control console. The rails shall be a minimum 39-3/4” high and shall not increase the overall travel height of the vehicle.

Elevation Mechanism

Two (2) 5" diameter elevating cylinders shall be mounted on the underside of the base section of the aerial ladder. A 1-3/4" pin shall fasten each cylinder to the turntable and a 2" pin shall fasten each cylinder to the aerial ladder. The elevating cylinders shall be mounted utilizing spherical bearings on both ends of the cylinders. The cylinders shall function only to elevate the ladder and not as a structural member to stabilize the ladder side movement. The elevating cylinders shall be provided with pilot-operated check valves to prevent movement of the ladder in case of a loss of hydraulic pressure. The elevating cylinders shall be able to raise and lower the aerial ladder to any angle from -8 degrees to +76 degrees.

The elevation system shall be designed following the current edition of NFPA 1901. The elevation cylinders shall incorporate cushions on the upper limit of travel. The elevation cylinders shall also serve as a locking device to hold the aerial in the stored position for road travel.

Rotation Mechanism

The aerial shall be supplied with a powered rotation system as outlined in the current edition of NFPA 1901. This system shall provide continuous rotation under all rated conditions and shall be supplied with a brake to prevent unintentional rotation.

Rotation shall be accomplished by a high-torque hydraulic motor driven through a spring-engaged, hydraulically-released, multiple-disc brake into a planetary gear box. The gear box shall have a minimum continuous torque rating of 60,000 in. lbs. and a minimum intermittent torque rating of 120,000 in. lbs. The turntable bearing, ring gear teeth, spur gear, planetary gear box, and output shaft shall have a minimum safety factor of 2.5 to 1.

Hydraulic Swivel

A hydraulic swivel shall be installed to provide hydraulic fluid transfer to the aerial ladder cylinders, electrical power to the aerial ladder, and water delivery to the pre-plumbed waterway while permitting continuous 360-degree rotation. The swivel shall provide eight (8) hydraulic circuits, twenty four (24) electrical circuits, and one (1) 4" passage for waterflow. The swivel shall be environmentally-sealed to prevent contamination of the hydraulic fluid.

Aerial Ladder Control Station

An aerial ladder control station shall be supplied as outlined in the current edition of NFPA 1901. The control station shall be located on the left side of the aerial turntable. The apparatus shall be supplied with labels to warn of electrocution hazard. The control console shall provide a service access door on the front and side of the console to access hydraulic and electrical connections. The electrical panel shall be contained in a junction box with labeled wires. The control console shall be angled, labeled, and supplied with lights for night operation.

Console Cover

A diamond plate contoured hinged cover shall be supplied to protect the console from the elements. The cover shall latch in the stored position and swing away from the console so as not to interfere with sight of the aerial device.

Aerial Ladder Control Levers

The control levers shall be arranged as outlined in the current edition of NFPA 1901. The first lever from the left shall be the extension control (forward for extend and back for retract). The second lever shall be the rotation control (forward for clockwise and back for counter clockwise). The third handle shall be the elevation control (forward for down and back for up). The aerial shall employ direct hydraulic controls for precise control and dependable service with minimal electrical functions. A ring around the control levers shall be provided to prevent unintentional movement.

Rung Alignment Indicator

A light on the control console shall indicate when the ladder rungs are aligned for climbing.

Aerial Ladder Alignment Indicator

A reflective arrow mounted to the body and the turntable shall indicate when the aerial ladder is aligned with the forward aerial ladder support.

Load Indication System

A lighted elevation/safe-load indicator diagram shall be located on the lower left side of the base section to indicate safe load capacity at any angle of elevation. The safe load indicator shall be 15” x 15” in size and shall clearly communicate the aerial ladder capacity in any one of the following conditions: tipload, tipload with water flowing, and distributed load at full extension. The chart shall identify capacity using graphic characters to indicate each 250 lb. increment. The chart shall be equipped with lighting and warn of electrocution hazards from power lines and lightning.

An extension indicator shall be located on the handrails of the base section to indicate feet of extension. The control pedestal shall also come equipped with a hydraulic oil pressure gauge and lights for night operation.

Aerial Waterway

One (1) 1,000 gpm pre-piped waterway shall be supplied as outlined in the current edition of NFPA 1901. The waterway shall telescope to the end of the fly section. A waterway of 4” internal diameter shall pass through the turntable and a swivel joint to connect to the tubular aerial waterway. The tubular waterway shall run under the aerial ladder. The waterway tubes shall have the following sizes:

Base Section: 4-1/2” OD
Mid Section: 4” OD
3rd Section: 3-1/2” OD

The base section shall be constructed of regular aluminum and the second and third sections of the waterway shall be constructed of hard coat anodized aluminum and shall telescopic with the aerial ladder through sealed slip joints. The slip joints shall be designed with grease zerk fittings to facilitate lubrication.

A 1-1/2” drain valve shall be installed and operated from the rear of the apparatus to drain the waterway.

The water system shall be capable of flowing 1,000 gpm at 100 psi nozzle pressure at full elevation and extension. The friction loss between the tip and below the swivel shall not exceed 100 psi while flowing 1,000 gpm as outlined in NFPA 1901.

Waterway Relief Valve

An automatic relief valve preset at 250 psi shall be installed in the aerial waterway to prevent over-pressurization of waterway system. The relief valve shall be mounted in the lower portion of the waterway where it enters the aerial torque box frame and dumps under the apparatus.

Ladder Tip Steps

Two (2) folding steps shall be located near the ladder tip to provide a position for a firefighter using the ladder pipe/monitor as outlined in the current edition of NFPA 1901. The steps shall have a raised surface for traction and cut outs for easy manual deployment. Each step shall have a minimum load rating of 500 lbs. and shall have a minimum step area of 35 sq. in.

AERIAL HYDRAULIC SYSTEM OPTIONS

Aerial Hydraulic Oil Level Gauge

A hydraulic oil level gauge shall be supplied for easy fluid level verification. The three-light system shall indicate full oil level with a green light, acceptable oil level with yellow light, and low oil level with a red light. The display shall be located on pump operators panel.

MONITORS

1000 GPM Electric Monitor

The aerial ladder shall come equipped with an Elkhart Scorpion 8294 electrically controlled monitor with an SM-100-E straight stream to fog nozzle. The monitor shall be installed near the tip of the third section. Control switches for horizontal movement, vertical movement and

pattern selection shall be located at the control panel. The monitor and nozzles shall be capable of discharging 300 to 1000 gpm at 100 psi nozzle pressure.

The operational range of the electric monitor and nozzle shall be 135 degrees through the vertical plane (90 degrees upwards from a line perpendicular to the aerial ladder and 45 degrees downward), and 180 degrees through the horizontal plane (90 degrees to either side of the aerial ladder center line). The monitor shall be able to move in the horizontal and vertical axis simultaneously.

Monitor Tip Controls

In addition to the controls at the operator console, electric monitor directional and stream controls shall be installed in close proximity to the monitor on the ladder.

AERIAL WARNING LIGHTS

Outrigger Warning Lights

Weldon Model 1010 surface mounted outrigger warning lights with red lenses shall be provided.

The lights shall be surface mounted on the outrigger covers in compliance with current NFPA 1901.

AERIAL LIGHTING

Tip Spotlight

A 12V Collins spotlight model FX-12 with switch shall be provided on the tip of the aerial device. The light shall be located right side tip.

Ladder Base Lighting

There shall be two (2) Collins deck lights mounted one on each side at the bottom of the ladder base section. They shall be controlled from the turntable operating pedestal.

Ladder Climbing Lights

A lighting system to illuminate the climbing area inside each ladder section shall be provided. The lights shall be located above ladder rung level and directed toward the centerline of the ladder to reduce glare. A minimum of three 12 volt lights per section, with polished guards shall be wired and attached so as not to be an obstruction during climbing. The lights shall be controlled with the ladder lights switch at the operators control console. The lens colors shall be Red.

Quartz Light

A Kwik-Raze model 36 Magnafire quartz light head with 750-watt 120-volt halogen bulb rated at 25,200 Lumens mounted on a Kwik-Raze model 600 permanent mount non-telescoping base shall be installed on the aerial device and hardwired to the aerial tip. The light shall be fitted with a weather-resistant switch to control the light when the aerial power circuit is activated. The light shall be located left side tip.

WATERWAY OPTIONS

Pinned Waterway Upgrade

A remote-controlled monitor/nozzle assembly shall be attached to a ladder fly section through C-channel slide pads which shall allow the monitor/nozzle assembly to be positioned at the tip of a section for maximum master stream reach or at the tip of the next section down for unobstructed rescue capabilities. The monitor/ nozzle assembly shall be pinned at either operating location with a single stainless steel ”T” handle locking ball pin. A monitor control station shall be attached to the sliding monitor/nozzle assembly and shall move with it.

The turntable monitor controls shall be connected to the sliding monitor system using an electronic multiplexing system that sends all monitor control signals over a shielded pair of wires through a spring retract electric cable reel. The collector rings in the cable reel shall be specifically designed for accurate transmission of electronic signals.

A gel-cell rechargeable battery shall be located on the sliding monitor assembly. A dedicated ground wire and 12VDC positive charging wire shall be routed from the turntable control station through the electric cable reel to the monitor battery. The charging wire shall be directly connected to the chassis 12VDC battery system through a 20 amp auto reset circuit breaker.

The moveable monitor/nozzle assembly shall be capable of flowing from 300 gpm to 1000 gpm while maintaining a constant 80-100 psi nozzle pressure for maximum stream projection.

Waterway Inlet

One (1) 4” inlet shall be provided at the rear of the apparatus and shall be connected to the vertical pedestal waterway piping to supply water to the aerial waterway from an outside source. All fabricated piping shall be constructed of a minimum of Schedule 10 stainless steel piping to help prevent corrosion. The threads shall be NST. A long-handle chrome-plated 4” NST cap shall be installed on the inlet.

Waterway Pressure Gauge

One (1) Class 1 weatherproof 2-1/2” compound vacuum pressure gauge with a range of 30-0-600 shall be installed adjacent to the waterway inlet. The function of the gauge is to advise the aerial operator of the pressure within the waterway. The gauge shall be filled with a liquid solution.

Flowminder

The aerial shall be equipped with one (1) Class 1 brand Flowminder for the aerial waterway to digitally display the actual volume of water being discharged in gallons per minute and the total volume of water that has flowed through the waterway.

The readout shall be mounted at the turntable control station.

The Flowminder shall consist of:

• Weatherproof digital flow display with super-bright digits at least 1/2” (0.5”) high. The display shall read actual flow and shall switch to total flow when the totalizer button is depressed and held.
• Flow transmitter mounted in the aerial waterway pipe above the swivel. The transmitter shall consist of a weather-resistant black-anodized housing with brass wetted parts with a double paddle wheel.
• Connecting cables to connect the digital display to the flow transmitter and apparatus power.
• Machined mounting hardware to hold the transmitter in position in the discharge line.

The Flowmeter shall be checked and calibrated prior to delivery of the apparatus.

MISC AERIAL ELECTRICAL

Aerial Tip Receptacle

A 110-volt Twist Lock 15 amp receptacle outlet shall be installed at the tip of the aerial device and wired into an apparatus breaker box with a 30-amp breaker. The breaker shall be fitted with a GFI protection feature. The receptacle box shall be fitted with a weather resistant cover.

Two-Way Intercom

A two way Atkinson Dynamics (Federal Signal) intercom system shall be installed to provide communications between the turntable control station and the aerial tip. The system shall consist of a 12 volt transistorized amplifier and two (2) waterproof speaker / microphones.

In addition to the combination speaker / microphone, the turntable shall include a volume control and a push to talk button. The speaker / microphone at the tip shall be hands free operation.

AERIAL EQUIPMENT

Axe Bracket

Axe bracket shall consist of one stainless steel blade bracket and one chrome handle restrainer mounted on the aerial.

Location: left side fly section

Pike Pole Mount

There shall be an aluminum tube mounted directly on the ladder for storage of a 6` pike pole. The tube shall be located right side fly section.

AERIAL LADDER BRACKETS

Roof Ladder Bracket

A lift-out style roof ladder mounting bracket shall be installed on the outside of the ladder base section. The bracket shall be designed to hold a PRL-14 on left side of base section.

SIGN PLATES

Aerial Sign Plate

Two (2) 10” x 144” x 1/8” (0.125”) thick smooth aluminum plates shall be provided. The plates shall have 1” lips top and bottom for rigidity. Each sign plate shall be bolted on either side of the base section, approximately at the midpoint. The plates shall be provided to display the department`s name or other information. The plates shall be painted Job Color as specified by the customer.

AERIAL TESTING

Third-Party Flow Test

A flow test shall be conducted to determine that the water system is capable of flowing 1,000 gpm at 100 psi nozzle pressure with the aerial device at full extension and elevation. When the aerial apparatus is equipped with a fire pump, the test shall be conducted using the onboard pump. Intake pressure for the onboard pump shall not exceed 20 psi.

In addition to the flow test, a hydrostatic test shall be done on the waterway system. The permanent water system, piping, and monitor shall be hydrostatically tested at the maximum operating pressure required to flow 1,000 gpm at 100 psi nozzle pressure at maximum elevation and extension.

These results shall be certified by an independent, third-party testing organization, per NFPA 16.13.1 through 16.13.1.3.

Aerial Certification

All certification shall be performed by a certification organization that is accredited for inspection and testing systems on fire apparatus in accordance with ISO/IEC 17020, General criteria for the operation of various types of bodies performing inspection or ISO/IEC Guide 65, General requirements for bodies operating product certification systems.

All quality control testing shall be performed by an ASNT-certified level II Non-Destructive Test Technician. The aerial ladder shall be tested in compliance with the current editions of NFPA 1901 and NFPA 1911. All sub-assemblies are to be inspected before assembly and body mounting.

Each aerial section shall be tested prior to the assembly of the complete aerial device. Each section shall be subjected to a visual weld inspection to assure the integrity of the weldment. Die penetrant shall be used as required to qualify suspected weld defect indications. All turntable mounting bolts, cylinder anchor pins, outrigger anchor pins, aerial hinge pins, and other critical mounting components are subjected to ultrasonic testing to detect any flaws.

A magnetic particle test shall be conducted on the torque box, aerial support structure, outriggers, outrigger support structure and all other structural ferrous aerial components. This test shall be performed to assure the integrity of the weldment.
After the aerial is assembled and installed on the vehicle, an operational inspection shall be made and the aerial shall be tested to comply with the applicable standards in the current editions of NFPA 1901 and NFPA 1911.

In addition to the above tests, the aerial shall successfully complete the following operational tests:

1) The completed apparatus shall be placed on a firm, level surface with the aerial stabilizers extended and down. The aerial shall lift a test weight equal to the rated tip load capacity, as specified herein, with the aerial at full extension, 0 degrees elevation, and rotated 90 degrees to either side of the truck chassis. The test weight shall be lifted from 0 degrees to 15-20 degrees. The test weight shall be suspended from a position equal to the position of the outermost rung of the fly section or the center of the platform when so equipped. The aerial shall lift the test weight smoothly and evenly with no twisting or jerking. This test shall be performed at the normal hydraulic system relief valve setting. No temporary adjustments to the relief valve shall be allowed.

2) The completed apparatus shall be placed on a firm, level surface with the aerial ladder stabilizers extended and down. A test weight equal to 1.5 times the aerial`s rated tip load capacity, shall be suspended from a position equal to the position of the outermost rung of the fly section (or center of the platform when so equipped), with the aerial in the straight-ahead position. The aerial shall then be rotated a full 360 degrees around the vehicle with the aerial at full extension and at 0 degrees elevation (or high enough to clear vehicle-mounted equipment). The aerial and vehicle shall show no signs of instability. This test shall be performed with no water in the tank, or hose, ladders, or removable equipment that would act as a counterbalance in order to simulate a worst-case condition.

3) The completed apparatus shall be placed on a firm surface having a minimum 5 degrees side slope with the aerial stabilizers extended and down. A test weight equal to 1.5 times the aerial`s rated tip load capacity, shall be suspended from a position equal to the position of the outermost rung of the fly section (or center of the platform when so equipped), with the aerial in the straight-ahead position. The aerial shall then be rotated 90 degrees to the downhill side with the aerial at full extension, 0 degrees elevation (or high enough to clear vehicle-mounted equipment). The aerial and vehicle shall show no signs of instability, and all of the stabilizers shall remain firmly on the ground. This test shall be performed with no water in the tank, or hose, ladders, or removable equipment that would act as a counterbalance in order to simulate a worst-case condition.

4) The completed apparatus shall be placed on a firm, level surface with the aerial stabilizers extended and down. A test weight equal to 2.0 times the aerial`s rated tip load capacity, shall be suspended from a position equal to the position of the outermost rung of the fly section (or center of the platform when so equipped), with the aerial in the straight-ahead position at full extension and at 8 degrees elevation (or high enough to clear vehicle-mounted equipment). After ten (10) minutes, the weight shall be removed, and the aerial shall be inspected for any abnormal twist or deflection.

5) The completed apparatus shall be placed on a firm, level surface with the aerial stabilizers extended and down. The aerial will be positioned at full extension at 0 degrees elevation at some position out of the travel rest and off the side or rear of the truck. For units without a pre-piped waterway to the tip, a test weight of 220# shall be applied horizontally and perpendicular to the tip of the aerial at the location of the outermost rung. The rotation brake shall not release nor shall the aerial`s deflection exceed the manufacturer`s accepted tolerances. For aerials with pre-piped waterways, a test weight of 350# will be applied at the location of water nozzle.

Upon satisfactory completion of all inspections and tests, an independent third-party inspection firm shall submit a certificate indicating that all specified standards have been met.

GROUND LADDERS

Folding Ladder

One (1) Alco-Lite FL-10, 10` aluminum folding ladder shall be provided. Both ends shall be equipped with molded rubber feet and the ladder shall have handles for easy carrying. The ladder shall meet or exceed the requirements of the current edition of NFPA 1931.

Alco Lite Roof Ladder

An Alco-Lite PRL-14, 14` roof ladder shall be provided. Folding steel roof hooks shall be attached to one end of the ladder with steel spikes on the other.

Alco Lite Roof Ladder

One (1) Alco-Lite PRL-16, 16` aluminum roof ladder shall be provided. A pair of folding 3/4" (0.75") steel roof hooks shall be attached to one end of the ladder, and a pair of steel spiked feet on the other end. The ladder shall meet or exceed the requirements of the current edition of NFPA 1931.

Alco Lite Extension Ladder

An Alco-Lite PEL-28, 28` two-section extension ladder shall be provided.

Alco Lite 3 Section Extension Ladder

One (1) Alco-Lite PEL3-35, 35` aluminum three-section extension ladder shall be provided. The fly section shall be operated by a cable and shall automatically extend as the center section is raised. The ladder shall meet or exceed the requirements of the current edition of NFPA 1931.

Little Giant Model 17 Ladder

A-Frame Ladder

One (1) Wing Enterprises Little Giant model 17 aluminum A-frame ladder shall be supplied. The ladder shall be equipped with a heavy-gauge steel locking device and ladder shoes for extra safety. It shall be capable of being used either as a 9` to 15` variable-length straight ladder or as an adjustable step ladder with the ability to be erected on stairs or other offset horizontal surfaces.

MISC LOOSE EQUIPMENT

DOT Required Drive Away Kit

Three (3) triangular warning reflectors with carrying case shall be supplied to satisfy the DOT requirement.

EXTERIOR PAINT

Paint Custom Cab

The apparatus cab shall be painted Akzo-Nobel FLNA3047 Red. The paint process shall meet or exceed current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The aluminum cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces of the body. Any vertically- or horizontally-hinged smooth-plate compartment door shall be painted separately to assure proper paint coverage on body, door jambs and door edges.

Paint process shall feature Akzo-Nobel's high solid LV products and be performed in the following steps:

- Corrosion Prevention - all raw material shall be pre-treated with the Weather Jacket Corrosion Prevention system to provide superior corrosion resistance and excellent adhesion of the top coat.
- Akzo-Nobel Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Akzo-Nobel High Solid LV (Top coat) - a lead-free, chromate-free high solid acrylic urethane top coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Akzo-Nobel High Solid LV (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated, after painting, for the purpose of mounting steps, handrails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment. The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, handrails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20 degree gloss meter.

Paint Body Large

The apparatus body shall be painted Akzo-Nobel FLNA3047 Red. The paint process shall meet or exceed current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The aluminum body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces of the body. Any vertically- or horizontally-hinged smooth-plate compartment door shall be painted separately to assure proper paint coverage on body, door jambs and door edges.

Paint process shall feature Akzo-Nobel's high solid LV products and be performed in the following steps:

- Corrosion Prevention - all raw material shall be pre-treated with the Weather Jacket Corrosion Prevention system to provide superior corrosion resistance and excellent adhesion of the top coat.
- Akzo-Nobel Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.

- Akzo-Nobel High Solid LV (Top coat) - a lead-free, chromate-free high solid acrylic urethane top coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Akzo-Nobel High Solid LV (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated, after painting, for the purpose of mounting steps, handrails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment. The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, handrails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20 degree gloss meter.

INTERIOR PAINT

Cab Interior Color

The interior of the cab shall be painted with Zolatone 20-64 grey.

LETTERING

Sign Gold Lettering

Sign Gold letters shall be applied as specified and to match existing Burlington apparatus.

Lettering Shade

Existing letter shall be shaded in a contrasting color.

STRIPING

Reflective Tape on Stabilizers

The two aerial ladder stabilizers which protrude beyond the side of the body shall be striped with white reflective tape. The tape shall be visible from the front and rear of the unit.

Scotchlite Stripe

A ”Hockey Stick” Scotchlite reflective stripe, 4” minimum in width, shall be applied horizontally across the front of cab and shall contour as it transitions from cab to body to comply with NFPA 1901. The color and location of the stripe to be specified by the purchaser.

Location: top of stripe flush with top of bumper and straight back

Color: White

Trim Stripes

A 1” Scotchlite stripe shall be applied above and below the “Hockey Stick” stripe. The stripes shall be spaced 1” away from the main stripe.

The stripe shall be Gold.

Sign Gold Body Stripe

A Sign Gold body stripe shall be provided on the right body side panel above the lower compartments. The stripe shall be 3/4” total in width, (1/2” gold stripe with a 1/8” black outline on both sides) and a clear polyurethane coating. The stripe shall be applied in four (4) large horizontal rectangles to replicate body side panels before they became flush / smooth.

Rear Body Scotchlite Striping

Printed chevron style Scotchlite striping shall be provided on the rear of the apparatus. The stripes shall consist of 6” Yellow/Red alternating stripes in an ”A” pattern. The striping shall be located on the rear facing extrusions, panels, doors and inboard/outboard of the beavertails if applicable.

WARRANTY / STANDARD & EXTENDED

Standard 1 Year Warranty

Statement of Warranty

1-Year Standard

The apparatus manufacturer shall provide a full 1-year standard warranty. All components manufactured by the apparatus manufacturer shall be covered against defects in materials or workmanship for a 1-year period. All components covered by separate suppliers such as engines, transmissions, tires, and batteries shall maintain the warranty as provided by the component supplier. A copy of the warranty document shall be provided with the proposal.

Lifetime Frame Warranty

The apparatus manufacturer shall provide a full lifetime frame warranty. This warranty shall cover all apparatus manufacturer designed frame, frame members, and crossmembers against defects in materials or workmanship for the lifetime of the covered apparatus. A copy of the warranty document shall be provided with the proposal. Frame warranties that do not cover crossmembers for the life of the vehicle shall not be acceptable.

10 Year 100000 Mile Structural Warranty

The apparatus manufacturer shall provide a comprehensive 10-year/100,000-mile structural warranty. This warranty shall cover all structural components of the cab and/or body manufactured by the apparatus manufacturer against defects in materials or workmanship for 10 years or 100,000 miles, whichever occurs first. Excluded from this warranty are all hardware, mechanical items, electrical items, or paint finishes. A copy of the warranty document shall be provided with the proposal.

10 Year Stainless Steel Plumbing Warranty

The apparatus manufacturer shall provide a full 10-year stainless steel plumbing components warranty. This warranty shall cover defects in materials or workmanship of apparatus manufacturer designed foam/water plumbing system stainless steel components for 10 years. A copy of the warranty document shall be provided with the proposal.

20 Year Aerial Device Structural Warranty

The aerial manufacturer shall provide a 20 year structural integrity warranty on the aerial device. This warranty shall cover structural components and shall be extended for a period of 20 years after the date on which the vehicle is delivered to the original purchaser. A copy of the warranty document shall be provided with the proposal. Please refer to warranty document for complete details and exclusions.

10 Year Paint and Corrosion Warranty

The apparatus manufacturer shall provide a 10-year limited paint and corrosion perforation warranty. This warranty shall cover paint peeling, cracking, blistering, and corrosion provided the vehicle is used in a normal and reasonable manner.

The paint shall be prorated for 10 years as follows:

Topcoat & Appearance: Gloss, Color Retention, Cracking		Coating System, Adhesion & Corrosion: Includes Dissimilar metal corrosion, Flaking, Blistering, Bubbling	
0 to 72 months	100%	0 to 36 months	100%
73 to 120 months	50%	37 to 84 months	50%
		85 to 120 months	25%

Corrosion perforation shall be covered 100% for 10 years.

The warranty period shall begin upon delivery of the apparatus to the original user-purchaser. A copy of the warranty document shall be provided with the proposal.

UV paint fade shall be covered in a separate warranty supplied by Akzo Nobel (Sikkens) and shall be for a minimum of 10 years.

SUPPORT, DELIVERY, INSPECTIONS AND MANUALS

Training

The manufacturer shall provide three (3) days of training covering vehicle maintenance and operational familiarization.

This training shall be provided by a full time, manufacturer employee trainer who specializes in aerial training.

Approval Drawings

A general arrangement drawing depicting the vehicle`s appearance shall be provided. The drawing shall consist of left side, right side, front, and rear elevation views

Vehicles requiring pump controls shall include a general arrangement view of the pump operator`s position, scaled the same as the elevation views.

Electronic Manuals

Two (2) copies of all operator, service, and parts manuals MUST be supplied at the time of delivery in electronic format (CD-ROMs) -NO EXCEPTIONS! The electronic manuals shall include the following information:

Operating Instructions, descriptions, specifications, and ratings of the cab, chassis, body, installed components, and auxiliary systems.

Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and fire fighting systems.

Charts, tables, checklists, and illustrations relating to lubrication, cleaning, troubleshooting, diagnostics, and inspections.

Instructions regarding the frequency and procedure for recommended maintenance.

Maintenance instructions for the repair and replacement of installed components.

Parts Manual CD-ROM shall contain the following:

- Complete exploded view part drawings for every assemble specific to the truck. All repair components of the assembly shall be illustrated with part number assigned. This is NOT a generic parts manual.
- Mounting hardware listed on all exploded view drawings.
- Service kits and service parts listed where available.
- Recommended spare parts list.
- Reference drawings with easy to locate sub assemble page numbering.
- Warranty descriptions and coverage.

The CD-ROM shall incorporate a navigation page with electronic links to the operators manual, service manual, parts manual, and warranty information, as well as instructions on how to use the manual. Each copy shall include a table of contents with links to the specified documents or illustrations.

The CD must be formatted in such a manner as to allow not only the printing of the entire manual, but to also the cutting, pasting, or copying of individual documents to other electronic media, such as electronic mail, memos, and the like.

A find feature shall be included to allow for searches by text or by part number.

These electronic manuals shall be accessible from any computer operating system capable of supporting portable document format (PDF). Permanent copies of all pertinent data shall be kept file at both the local dealership and at the manufacturer`s location.

NOTE: Engine overhaul, engine parts, transmission overhaul, and transmission parts manuals are not included.

DEALER ADDED EQUIPMENT

Dealer

[1] Aerial Delivery to your Station.

[1] A set of On-Spot Automatic Tire Chains shall be installed.

[1] Travel for 2 Members of the Fire Department to Factory for Final Inspection and Acceptance shall be supplied.

[1] A set of Aluminum Cast Wheel Chocks and Mounting Hardware shall be included and installed in Department specified location.

Electrical

[1] A Portable Electric Junction Box shall be installed on the cord reel.

[1] A box style mounting bracket to hold the cord end electrical junction box shall be supplied. The box shall be smooth aluminum powder coated white. PLEASE SPECIFY horizontal or vertical mounting.

Graphics

Cab & Body Lettering to meet Dept. Specification shall be supplied.